

Comprehensive Lake Management Plan
For
Lake Noquebay

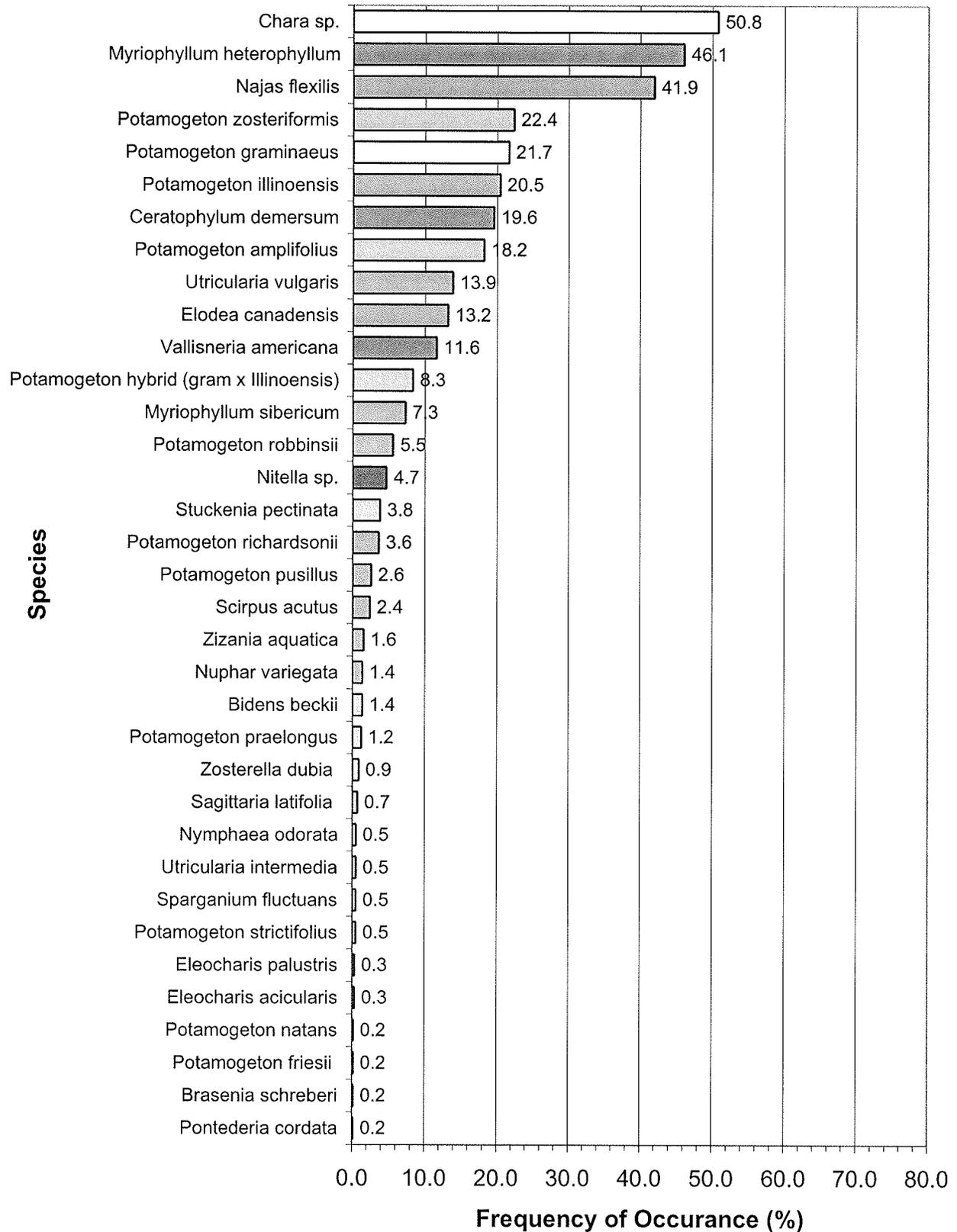
APPENDIX D

**Aquatic Plant Survey Data
For
Lake Noquebay**

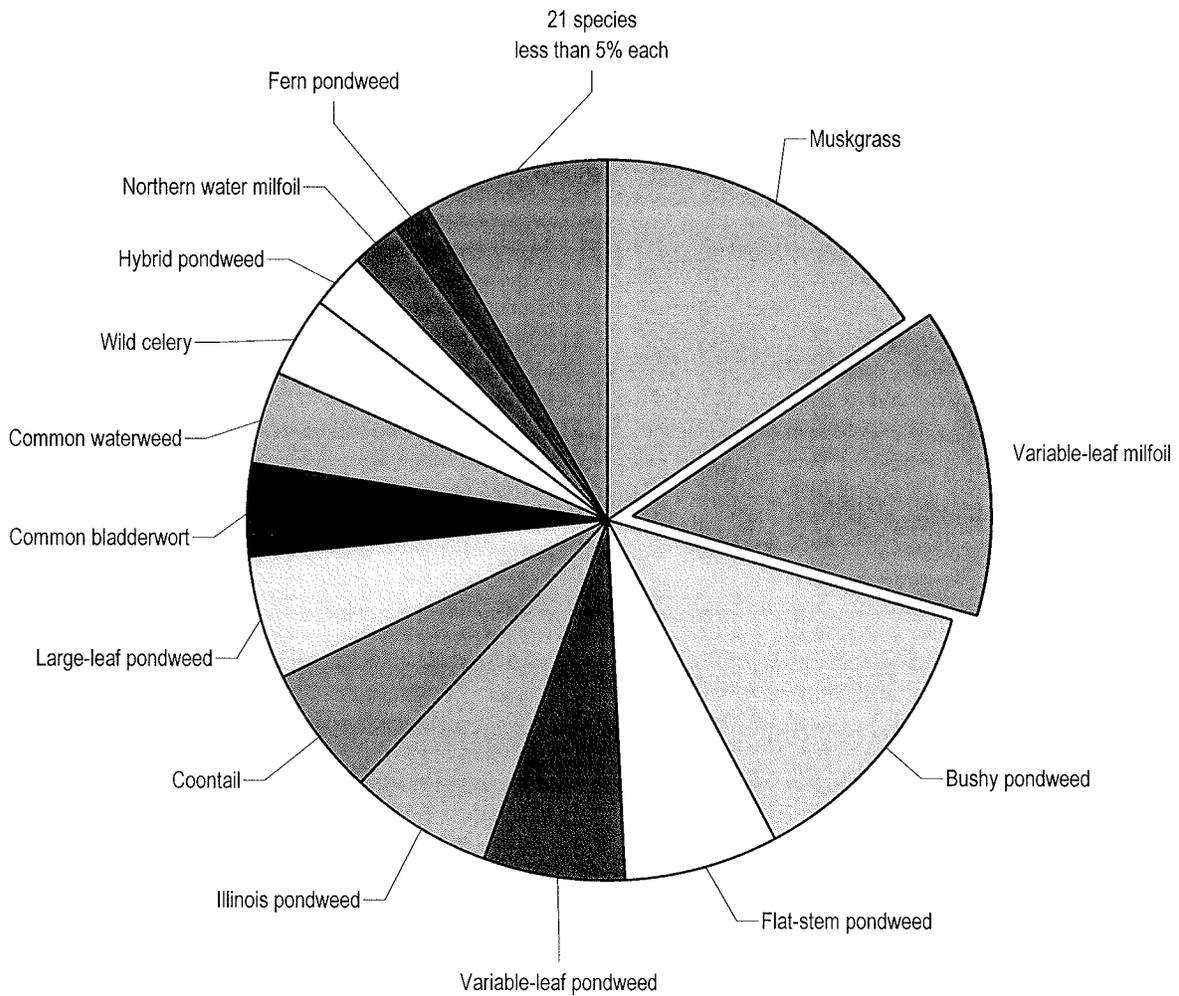
**Frequency of occurrence
(sorted by frequency)**

<u>Species</u>	<u>Common Name</u>	<u>Frequency</u>	<u>Relative Frequency</u>
Chara sp.	Muskgrass	50.8	15.5
Myriophyllum heterophyllum	Variable-leaf milfoil	46.1	14.0
Najas flexilis	Bushy pondweed	41.9	12.8
Potamogeton zosteriformis	Flat-stem pondweed	22.4	6.8
Potamogeton gramineus	Variable-leaf pondweed	21.7	6.6
Potamogeton illinoensis	Illinois pondweed	20.5	6.2
Ceratophyllum demersum	Coontail	19.6	6.0
Potamogeton amplifolius	Large-leaf pondweed	18.2	5.5
Utricularia vulgaris	Common bladderwort	13.9	4.2
Elodea canadensis	Common waterweed	13.2	4.0
Vallisneria americana	Wild celery	11.6	3.5
Potamogeton hybrid (gram x illinoensis)	Illinois x variable-leaf pondweed	8.3	2.5
Myriophyllum sibiricum	Northern milfoil	7.3	2.2
Potamogeton robbinsii	Fern pondweed	5.5	1.7
Nitella sp.	Stonewort	4.7	1.4
Stuckenia pectinata	Sago pondweed	3.8	1.2
Potamogeton richardsonii	Clasping-leaf pondweed	3.6	1.1
Potamogeton pusillus	Small pondweed	2.6	0.8
Scirpus acutus	Hard-stem bulrush	2.4	0.7
Zizania aquatica	Wild rice	1.6	0.5
Nuphar variegata	Spatterdock lily	1.4	0.4
Bidens beckii	Water marigold	1.4	0.4
Potamogeton praelongus	White-stem pondweed	1.2	0.4
Zosterella dubia	Water star grass	0.9	0.3
Sagittaria latifolia	Common arrowhead	0.7	0.2
Nymphaea odorata	White water lily	0.5	0.2
Utricularia intermedia	Flat-leaf bladderwort	0.5	0.2
Sparganium fluctuans	Floating-leaf burreed	0.5	0.2
Potamogeton strictifolius	Stiff pondweed	0.5	0.2
Eleocharis palustris	Hairgrass	0.3	0.1
Eleocharis acicularis	Creeping spikerush	0.3	0.1
Potamogeton natans	Floating-leaf pondweed	0.2	0.1
Potamogeton friesii	Fries' pondweed	0.2	0.1
Brasenia schreberi	Watersheild	0.2	0.1
Pontederia cordata	Pickerel weed	0.2	0.1

Lake Noquebay Aquatic Plant Frequency

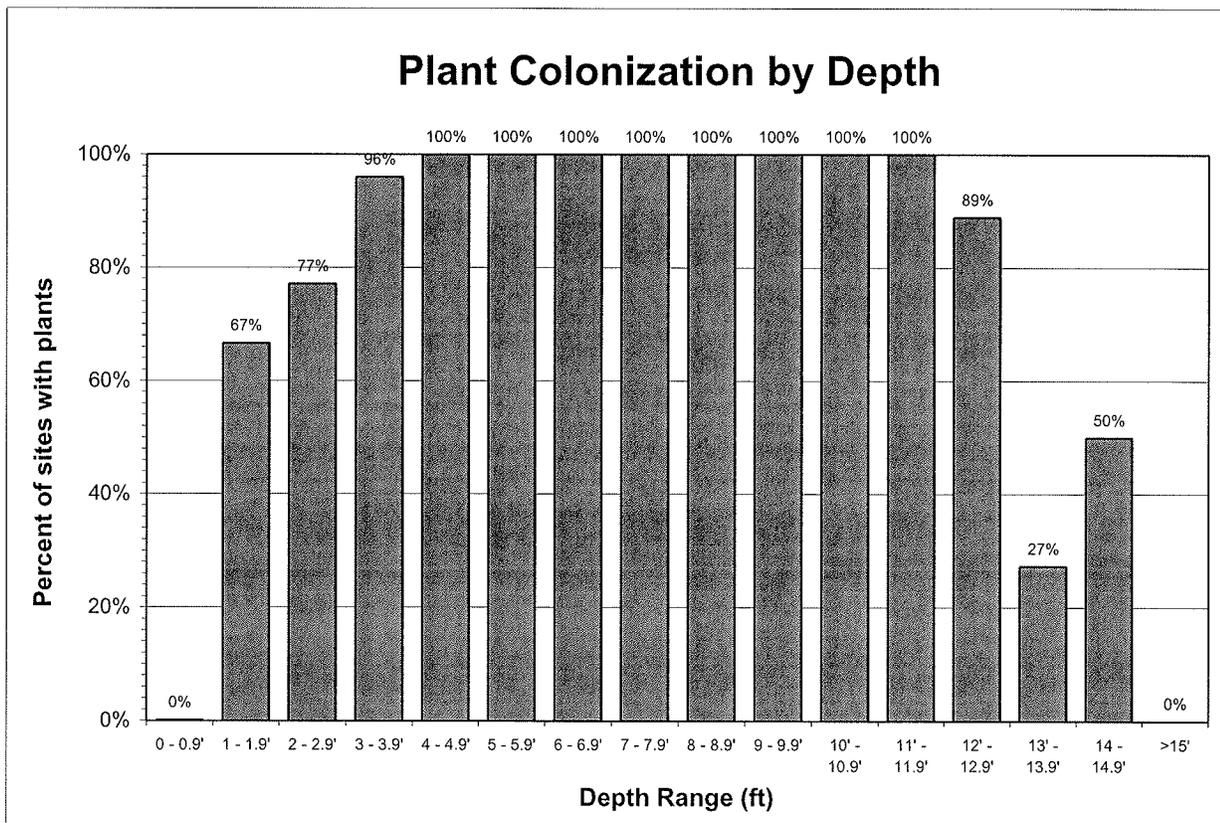


Dominant Aquatic Plants in Lake Noquebay (Relative Frequency of Occurance)

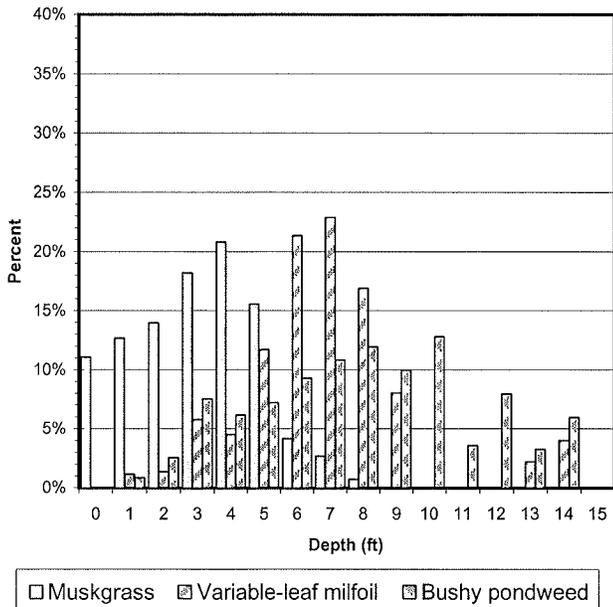


Plant Colonization by Depth (all plants)

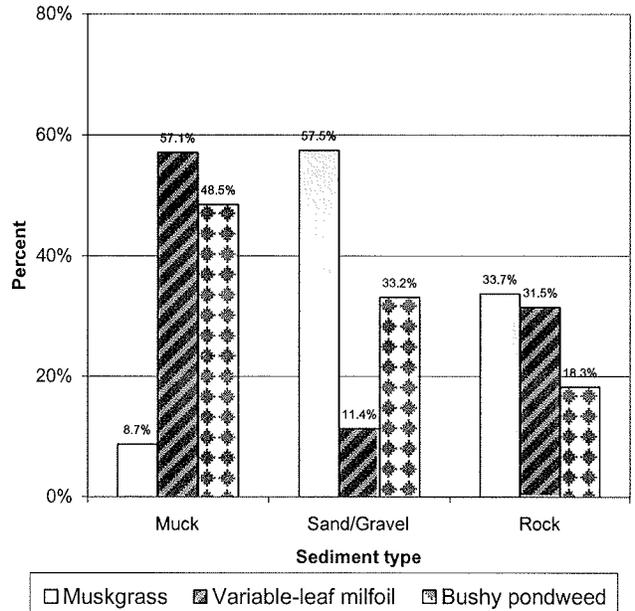
All Plants			
Depth Range	# of sites	# of sites with plants	% of sites with plants
0 - 0.9'	2	1	0%
1 - 1.9'	21	14	67%
2 - 2.9'	35	27	77%
3 - 3.9'	50	48	96%
4 - 4.9'	128	128	100%
5 - 5.9'	97	97	100%
6 - 6.9'	112	112	100%
7 - 7.9'	58	58	100%
8 - 8.9'	30	30	100%
9 - 9.9'	9	9	100%
10' - 10.9'	7	7	100%
11' - 11.9'	5	5	100%
12' - 12.9'	9	8	89%
13' - 13.9'	11	3	27%
14 - 14.9'	6	3	50%
>15'	150	0	0%
Total	730	550	1206%



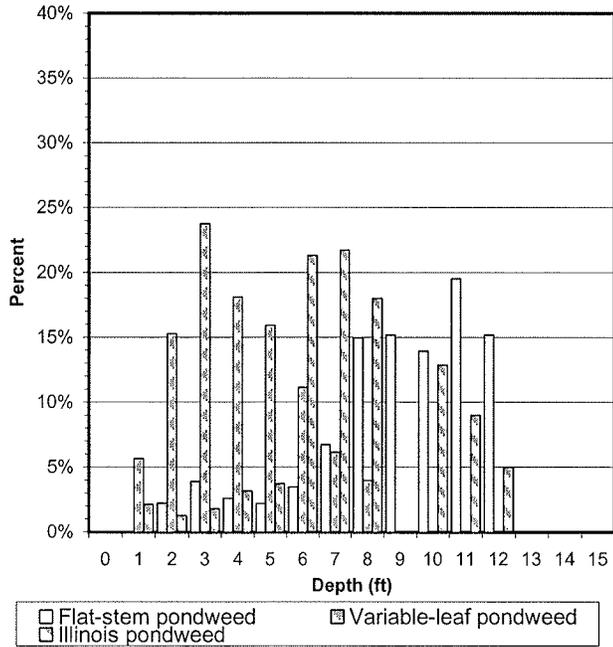
RELATIVE DEPTH PREFERENCE OF MAJOR AQUATIC PLANTS



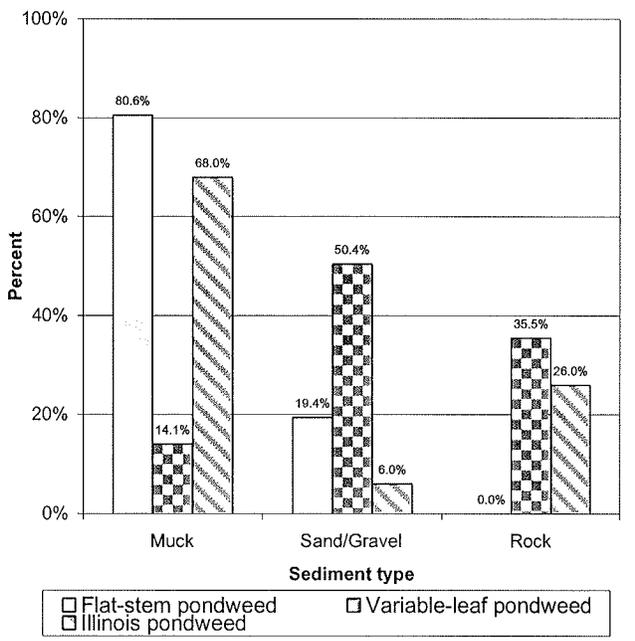
RELATIVE SEDIMENT PREFERENCE OF MAJOR AQUATIC PLANTS



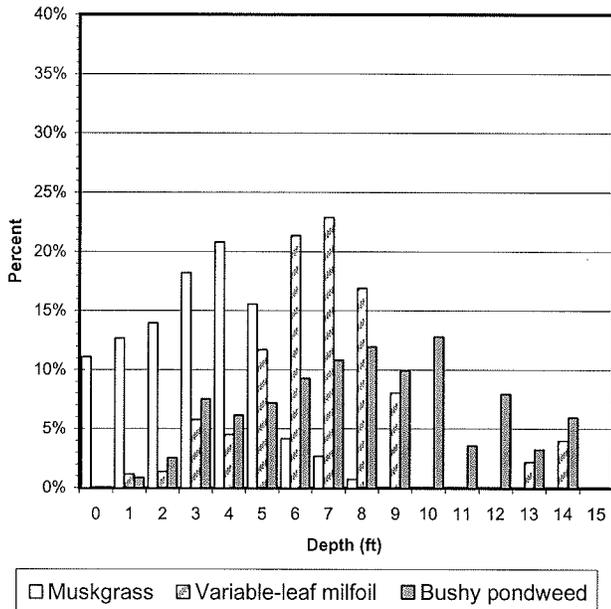
RELATIVE DEPTH PREFERENCE OF MAJOR AQUATIC PLANTS



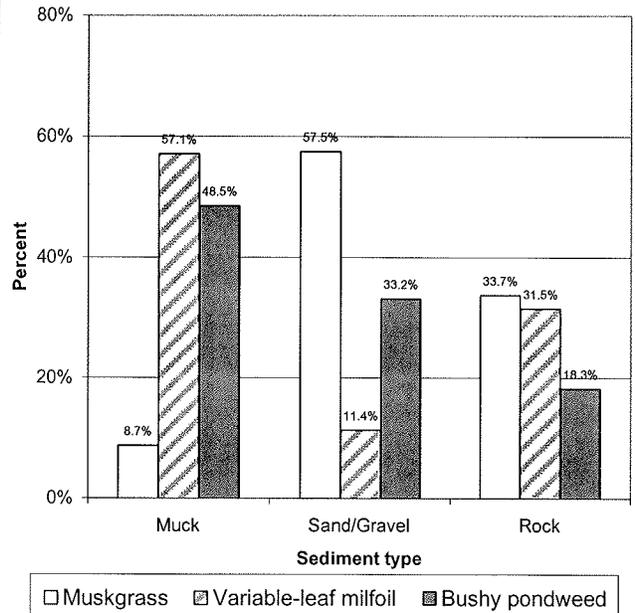
RELATIVE SEDIMENT PREFERENCE OF MAJOR AQUATIC PLANTS



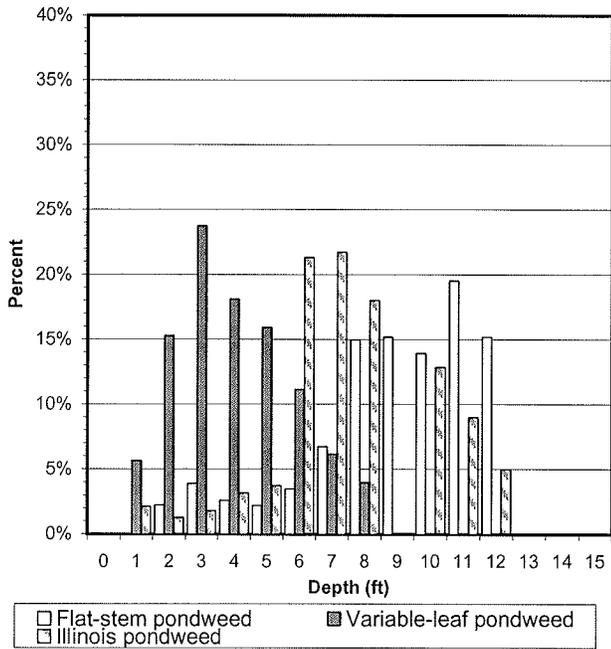
RELATIVE DEPTH PREFERENCE OF MAJOR AQUATIC PLANTS



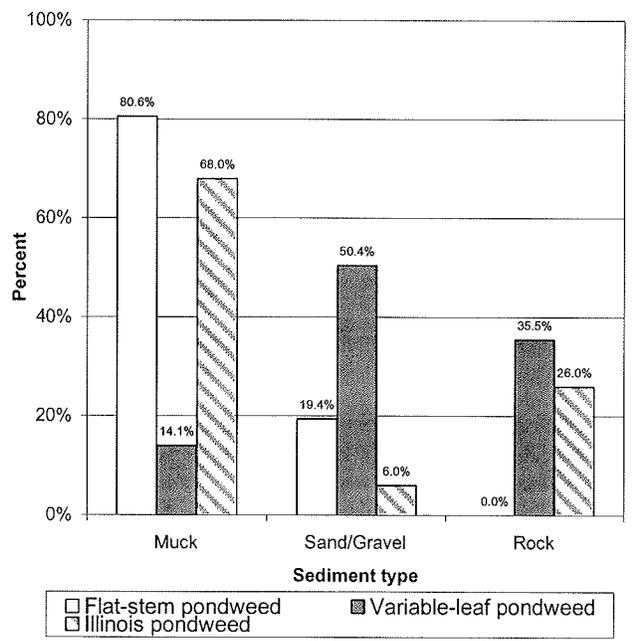
RELATIVE SEDIMENT PREFERENCE OF MAJOR AQUATIC PLANTS



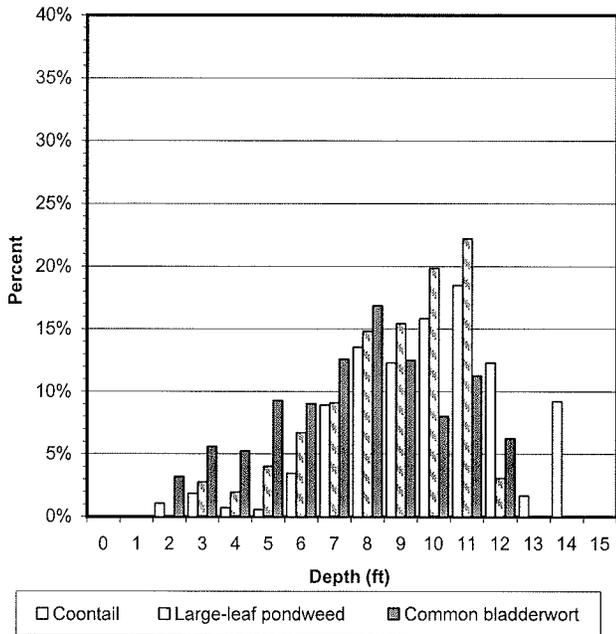
RELATIVE DEPTH PREFERENCE OF MAJOR AQUATIC PLANTS



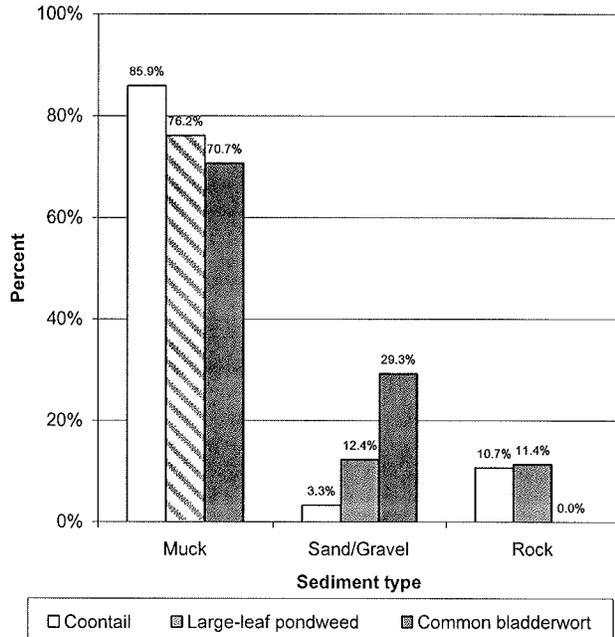
RELATIVE SEDIMENT PREFERENCE OF MAJOR AQUATIC PLANTS



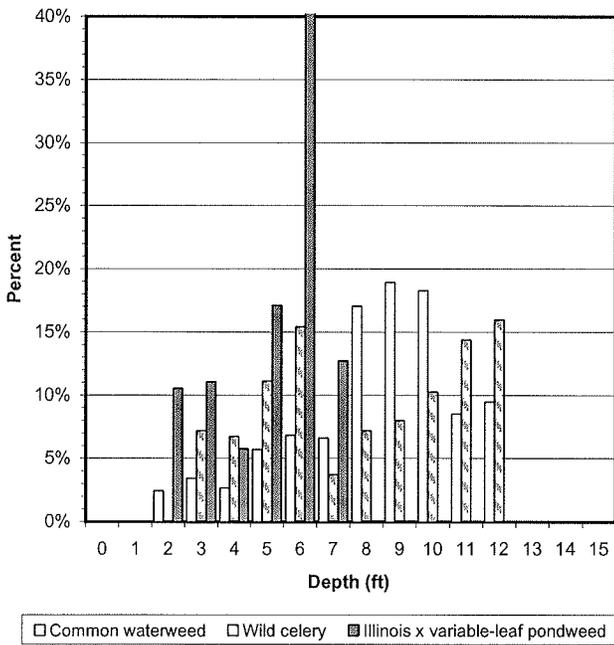
RELATIVE DEPTH PREFERENCE OF MAJOR AQUATIC PLANTS



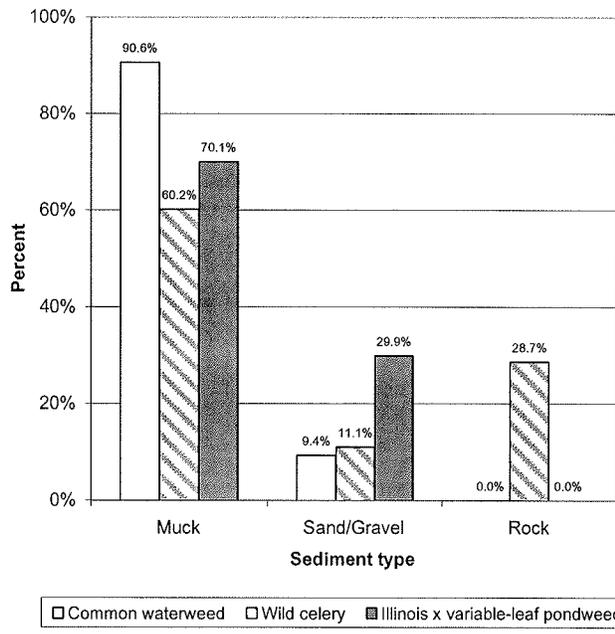
RELATIVE SEDIMENT PREFERENCE OF MAJOR AQUATIC PLANTS



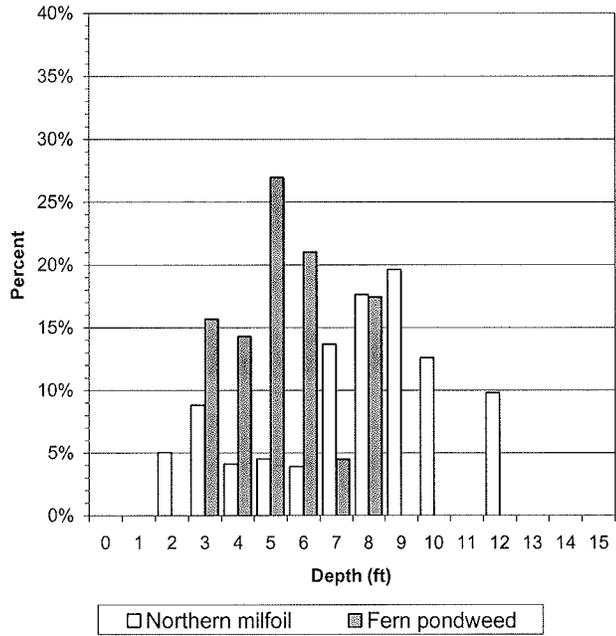
RELATIVE DEPTH PREFERENCE OF MAJOR AQUATIC PLANTS



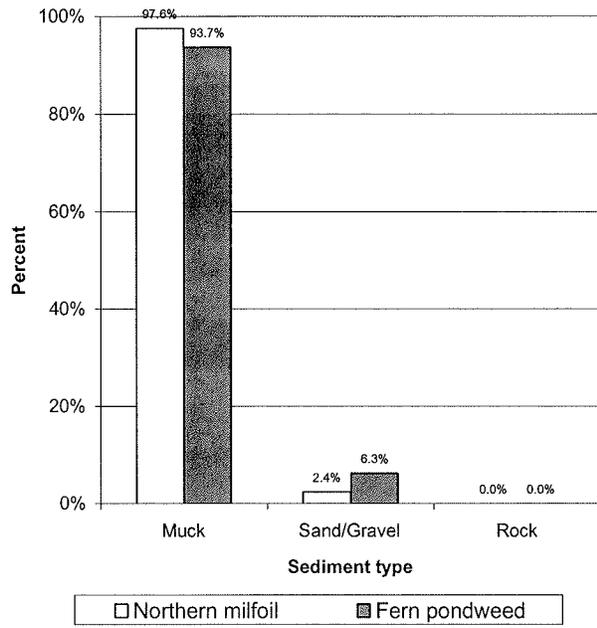
RELATIVE SEDIMENT PREFERENCE OF MAJOR AQUATIC PLANTS

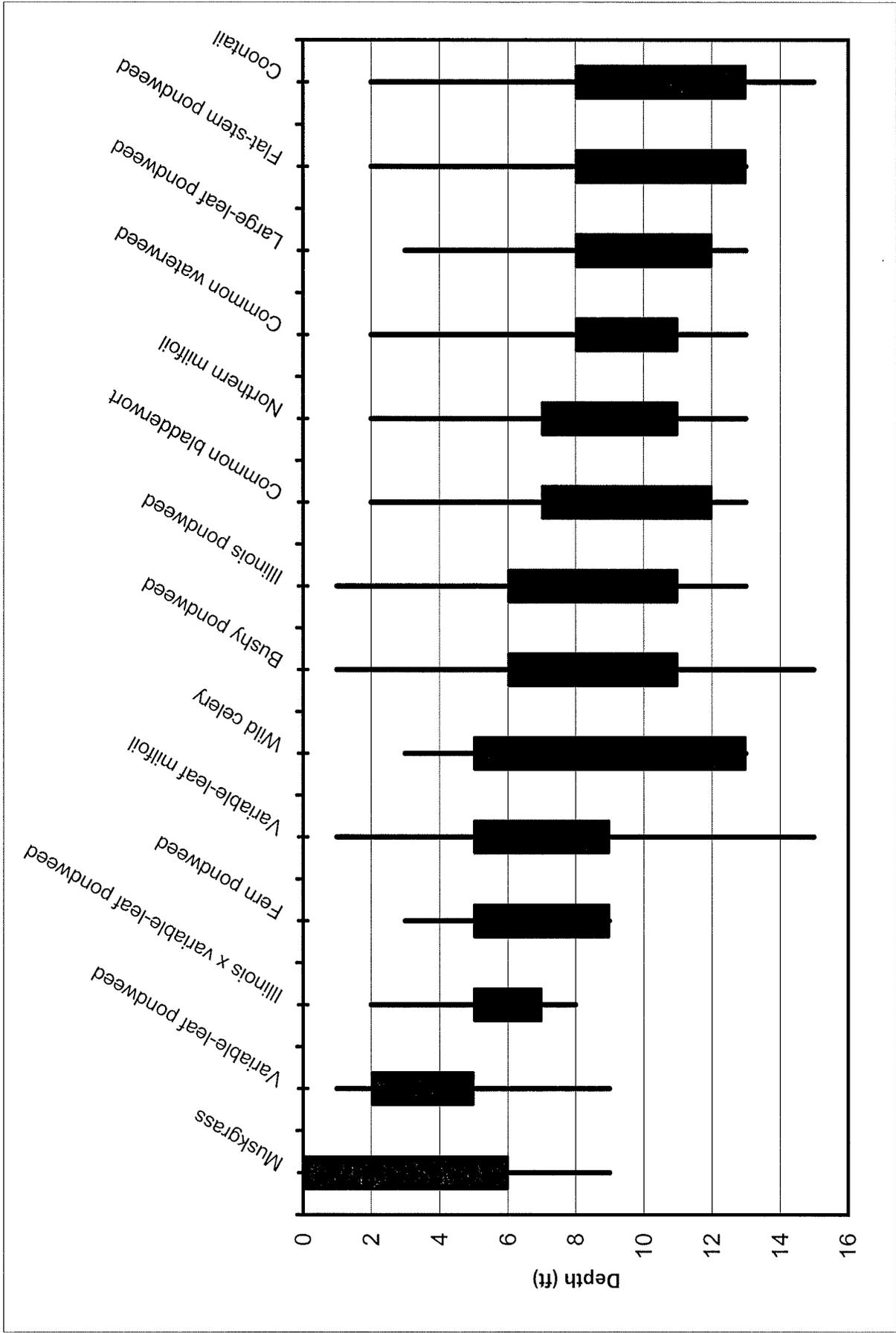


RELATIVE DEPTH PREFERENCE OF MAJOR AQUATIC PLANTS



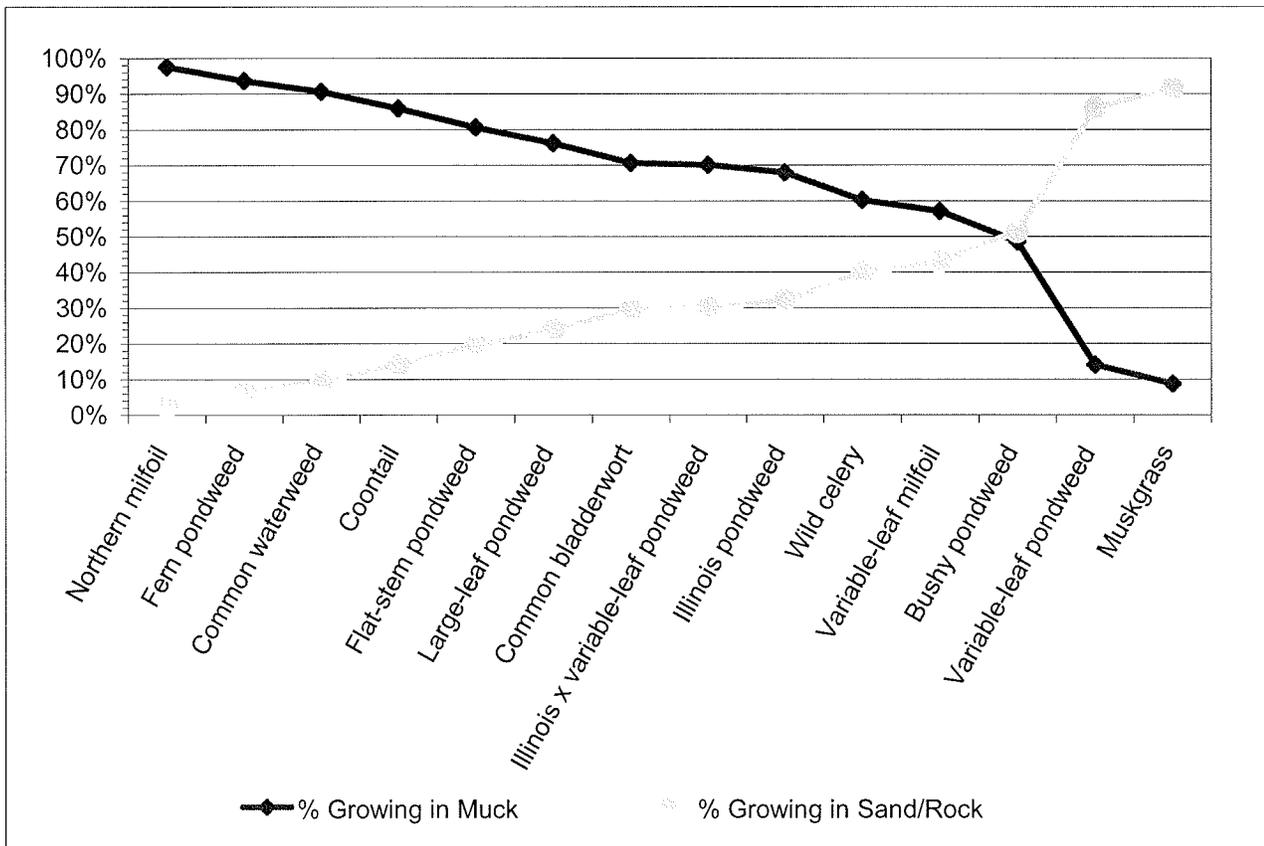
RELATIVE SEDIMENT PREFERENCE OF MAJOR AQUATIC PLANTS





Relative Sediment Preference

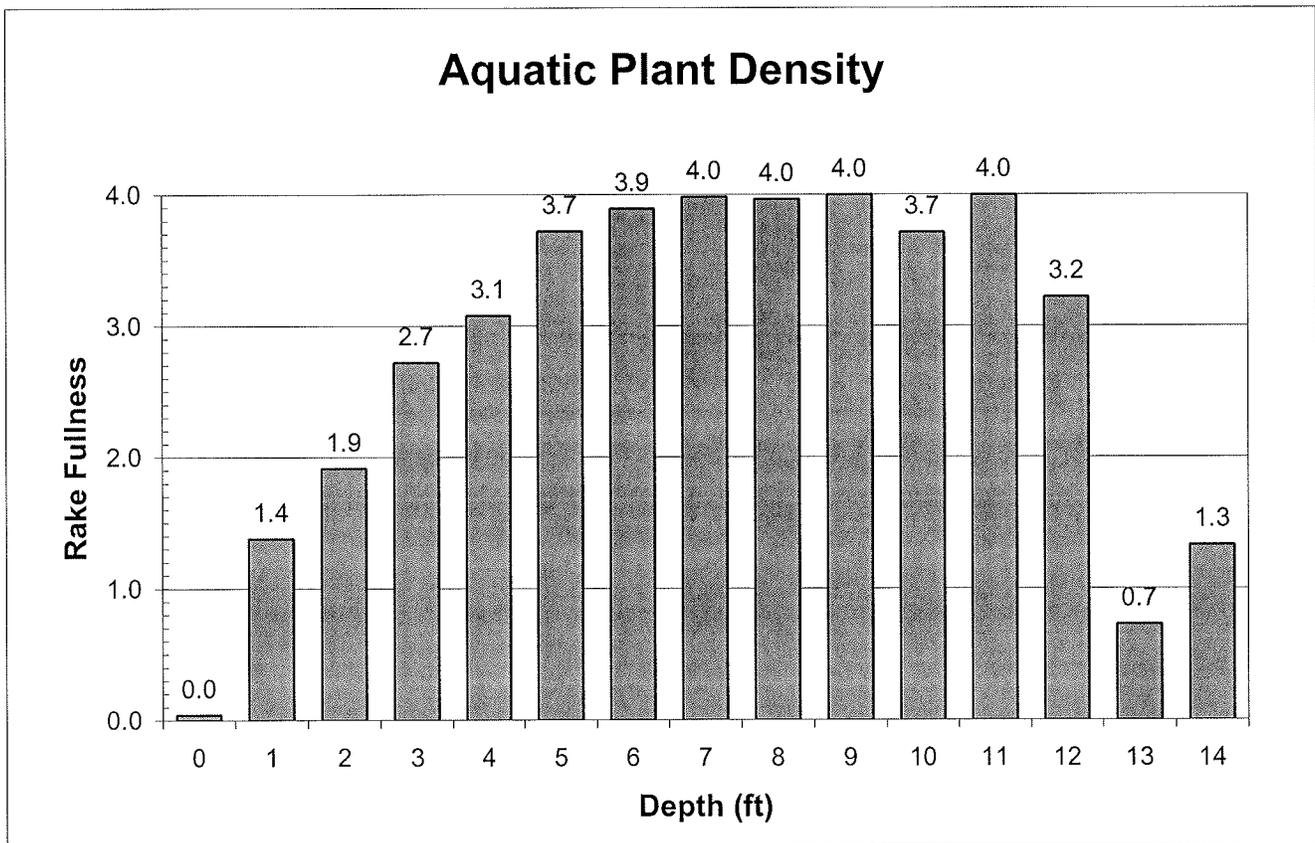
<u>Species</u>	<u>Muck</u>	<u>Sand</u>	<u>Rock</u>	<u>Sand & Rock</u>
Northern milfoil	97.6%	2.4%	0.0%	2.4%
Fern pondweed	93.7%	6.3%	0.0%	6.3%
Common waterweed	90.6%	9.4%	0.0%	9.4%
Coontail	85.9%	3.3%	10.7%	14.1%
Flat-stem pondweed	80.6%	19.4%	0.0%	19.4%
Large-leaf pondweed	76.2%	12.4%	11.4%	23.8%
Common bladderwort	70.7%	29.3%	0.0%	29.3%
Illinois x variable-leaf pondweed	70.1%	29.9%	0.0%	29.9%
Illinois pondweed	68.0%	6.0%	26.0%	32.0%
Wild celery	60.2%	11.1%	28.7%	39.8%
Variable-leaf milfoil	57.1%	11.4%	31.5%	42.9%
Bushy pondweed	48.5%	33.2%	18.3%	51.5%
Variable-leaf pondweed	14.1%	50.4%	35.5%	85.9%
Muskgrass	8.7%	57.5%	33.7%	91.3%



Aquatic Plant Density by Depth

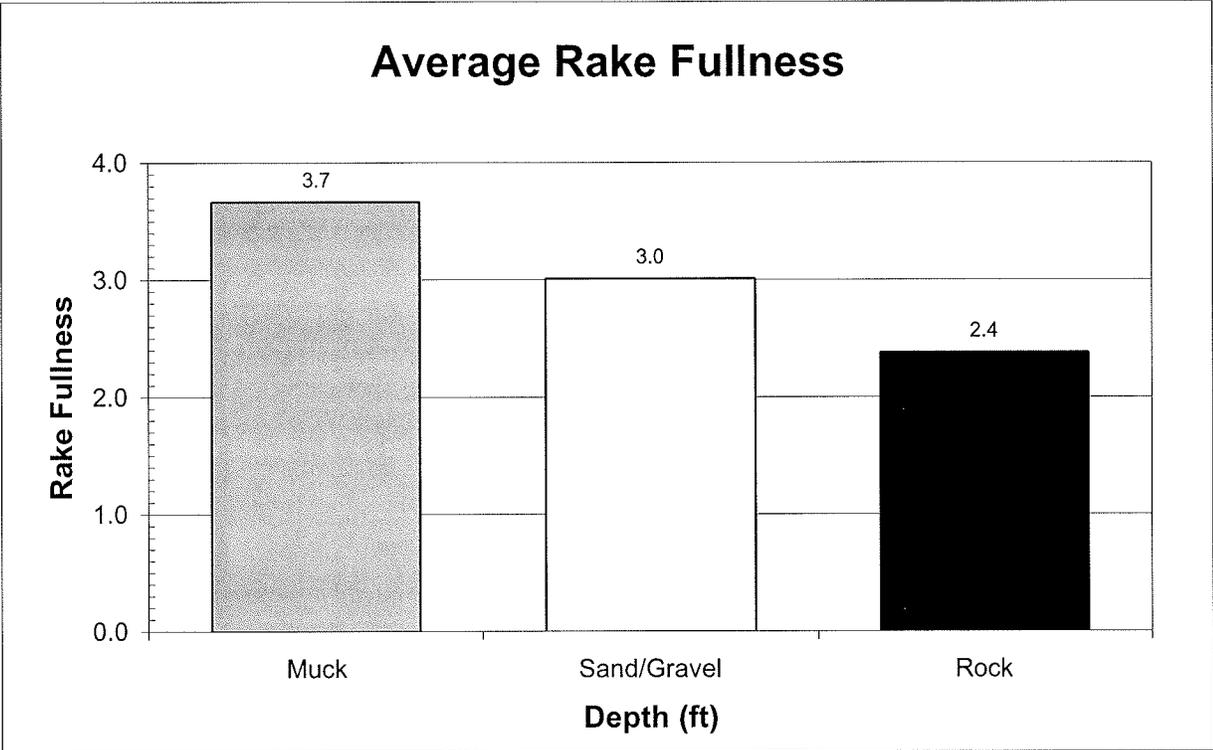
All Plants

<u>Depth Range</u>	<u>Depth</u>	<u># of sites</u>	<u>Avg. Rake Fullness</u>
0 - 0.9'	0	2	0.0
1 - 1.9'	1	21	1.4
2 - 2.9'	2	35	1.9
3 - 3.9'	3	50	2.7
4 - 4.9'	4	128	3.1
5 - 5.9'	5	97	3.7
6 - 6.9'	6	112	3.9
7 - 7.9'	7	58	4.0
8 - 8.9'	8	30	4.0
9 - 9.9'	9	9	4.0
10' - 10.9'	10	7	3.7
11' - 11.9'	11	5	4.0
12' - 12.9'	12	9	3.2
13' - 13.9'	13	11	0.7
14 - 14.9'	14	6	1.3
>15'	15	150	



Aquatic Plant Density by Sediment Type

<u>Sediment Type</u>	<u># of sites shallower than max depth of plants</u>	<u>Avg rake fullness</u>
Muck	280	3.7
Sand/Gravel	272	3.0
Rock	21	2.4
Total	573	

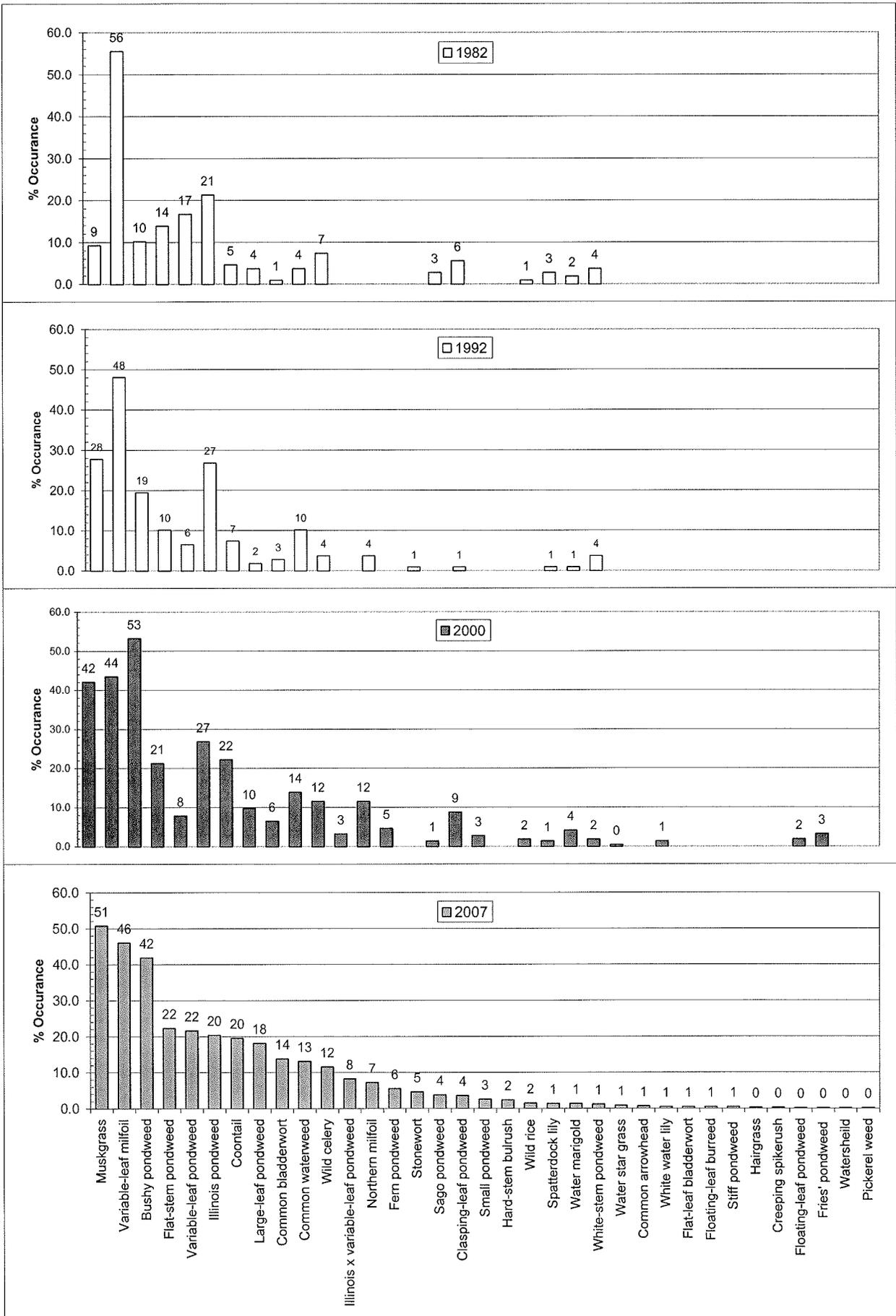


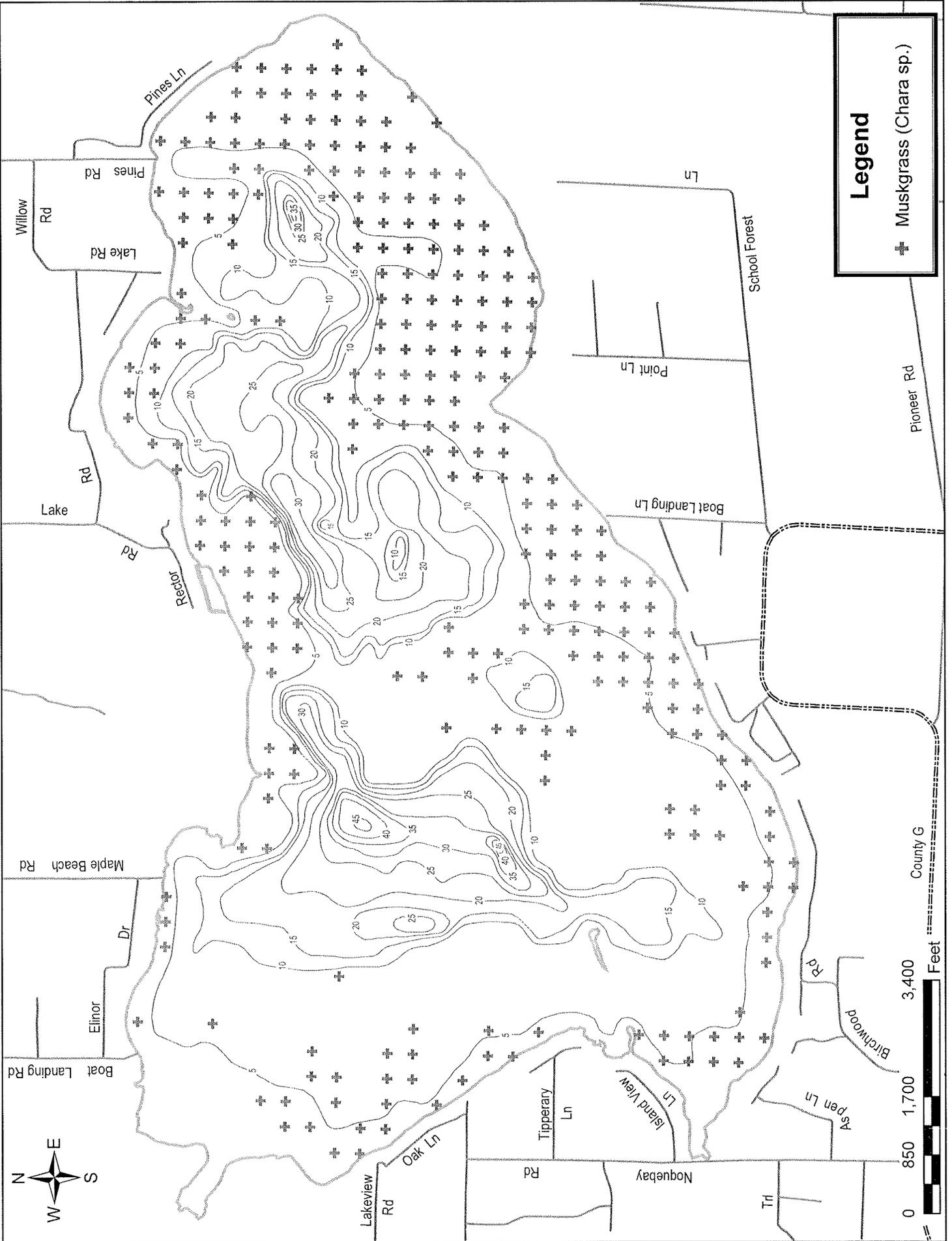
Historical Aquatic Plant Survey Data for Lake Noquebay

1982 & 1992 - Conducted by Northern Lake Service. Presence/absence surveys at 27 ample locations with 4 sample points each (n = 108 points)
 2000 - Conducted by Chuck Druckrey. Presence/absence survey at 54 sample locations with 4 sample points each (n = 216 points)
 2007 - Conducted by Chuck Druckrey. Presence/absence survey at 732 sample locations (n = 732 points, n = 579 below max depth of plant growth))

Sorted by Frequency (2007)

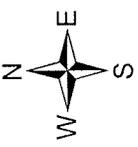
Species	Common Name	2007 Frequency	Relative Frequency	2000 Frequency	Relative Frequency	1992 Frequency	Relative Frequency	1982 Frequency	Relative Frequency
Chara sp.	Muskgrass	50.8	15.5	42.1	13.7	27.78	15.8	9.3	5.6
Myriophyllum heterophyllum	Variable-leaf milfoil	46.1	14.0	43.5	14.2	48.15	27.4	55.6	33.7
Najas flexilis	Bushy pondweed	41.9	12.8	53.2	17.3	19.44	11.0	10.2	6.2
Potamogeton zosteriformis	Flat-stem pondweed	22.4	6.8	21.3	6.9	10.19	5.8	13.9	8.4
Potamogeton gramineus	Variable-leaf pondweed	21.7	6.6	7.9	2.6	6.48	3.7	16.7	10.1
Potamogeton illinoensis	Illinois pondweed	20.5	6.2	26.9	8.7	26.85	15.3	21.3	12.9
Ceratophyllum demersum	Coontail	19.6	6.0	22.2	7.2	7.41	4.2	4.6	2.8
Potamogeton amplifolius	Large-leaf pondweed	18.2	5.5	9.7	3.2	1.85	1.1	3.7	2.2
Utricularia vulgaris	Common bladderwort	13.9	4.2	6.5	2.1	2.78	1.6	0.9	0.6
Elodea canadensis	Common waterweed	13.2	4.0	13.9	4.5	10.19	5.8	3.7	2.2
Vallisneria americana	Wild celery	11.6	3.5	11.6	3.8	3.7	2.1	7.4	4.5
Potamogeton hybrid (gram x Illinois x variable-leaf pondweed)	Illinois x variable-leaf pondweed	8.3	2.5	3.2	1.1	3.7	2.1		
Myriophyllum sibiricum	Northern milfoil	7.3	2.2	11.6	3.8				
Potamogeton robbinsii	Fern pondweed	5.5	1.7	4.6	1.5				
Nitella sp.	Stonewort	4.7	1.4			0.93	0.5		
Stuckenia pectinata	Sago pondweed	3.8	1.2	1.4	0.5			2.8	1.7
Potamogeton richardsonii	Clasping-leaf pondweed	3.6	1.1	8.8	2.9			5.6	3.4
Potamogeton pusillus	Small pondweed	2.6	0.8	2.8	0.9				
Scirpus acutus	Hard-stem bulrush	2.4	0.7						
Zizania aquatica	Wild rice	1.6	0.5	1.9	0.6			0.9	0.6
Nuphar variegata	Spatterdock lily	1.4	0.4	1.4	0.5	0.93	0.5	2.8	1.7
Bidens beckii	Water marigold	1.4	0.4	4.2	1.4	0.93	0.5	1.9	1.1
Potamogeton praelongus	White-stem pondweed	1.2	0.4	1.9	0.6	3.7	2.1		2.2
Zosterella dubia	Water star grass	0.9	0.3	0.5	0.2				
Sagittaria latifolia	Common arrowhead	0.7	0.2						
Nymphaea odorata	White water lily	0.5	0.2	1.4	0.5				
Utricularia intermedia	Flat-leaf bladderwort	0.5	0.2						
Sparganium fluctuans	Floating-leaf burreed	0.5	0.2						
Potamogeton strictifolius	Stiff pondweed	0.5	0.2						
Eleocharis palustris	Hairgrass	0.3	0.1						
Eleocharis acicularis	Creeping spikerush	0.3	0.1						
Potamogeton natans	Floating-leaf pondweed	0.2	0.1	1.9	0.6				
Potamogeton fresii	Fries' pondweed	0.2	0.1	3.2	1.1				
Brasenia schreberi	Watershield	0.2	0.1						
Pontederia cordata	Pickernel weed	0.2	0.1						
Total		328.6	100.0	307.4	100.0	175.94	100.0	164.8	100.0

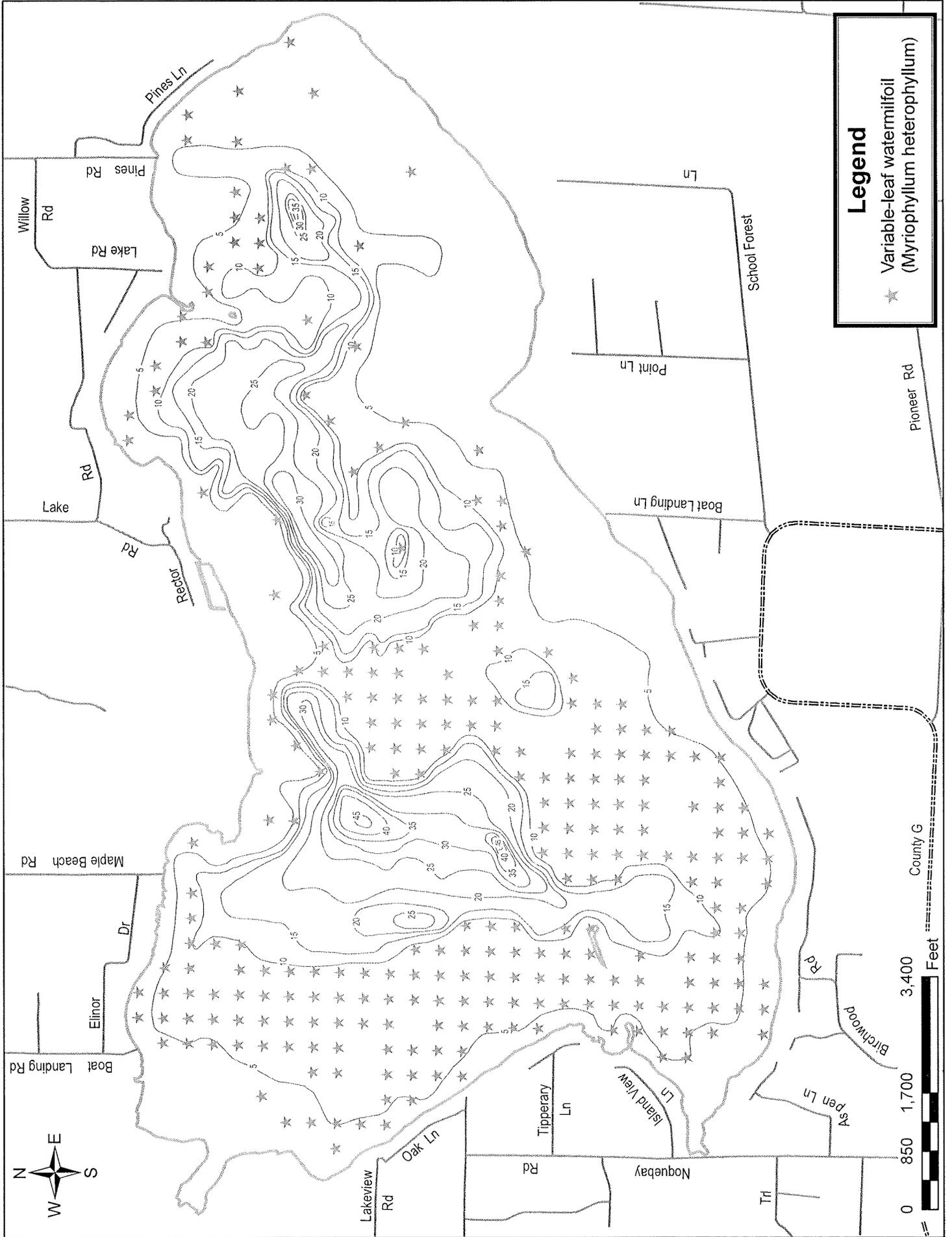




Legend

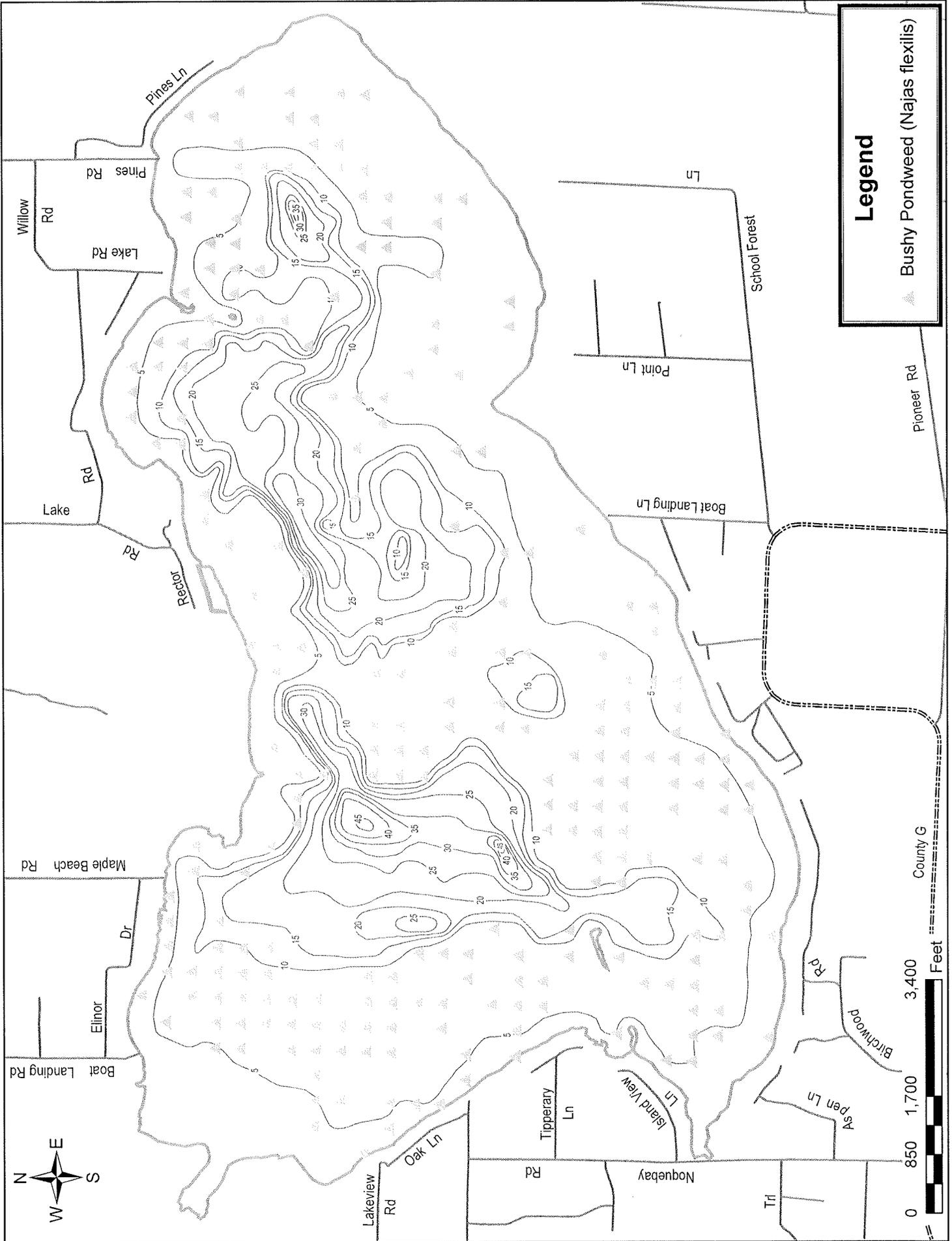
✦ Muskgrass (Chara sp.)





Legend

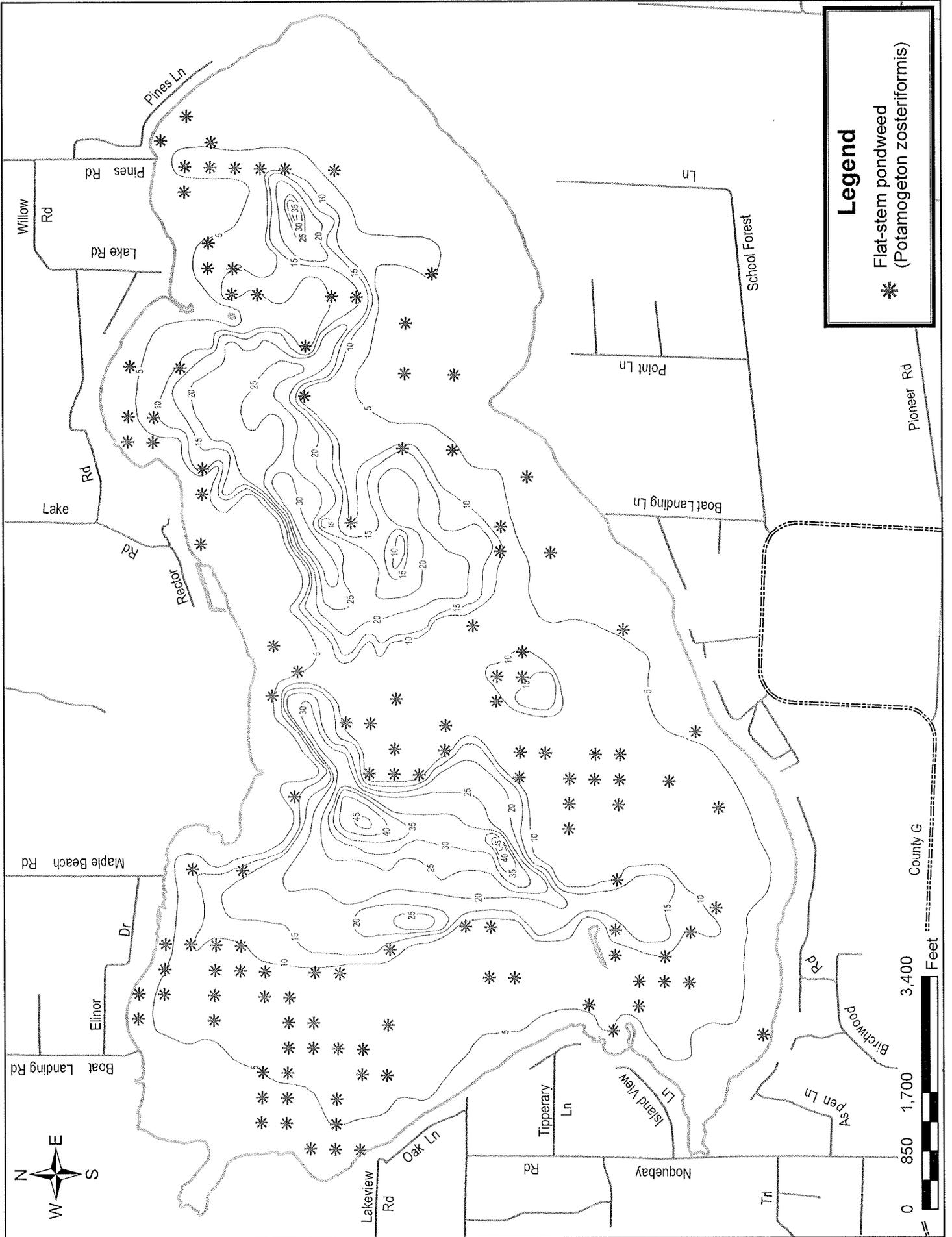
- ★ Variable-leaf watermilfoil (Myriophyllum heterophyllum)



Legend

▲ Bushy Pondweed (*Najas flexilis*)

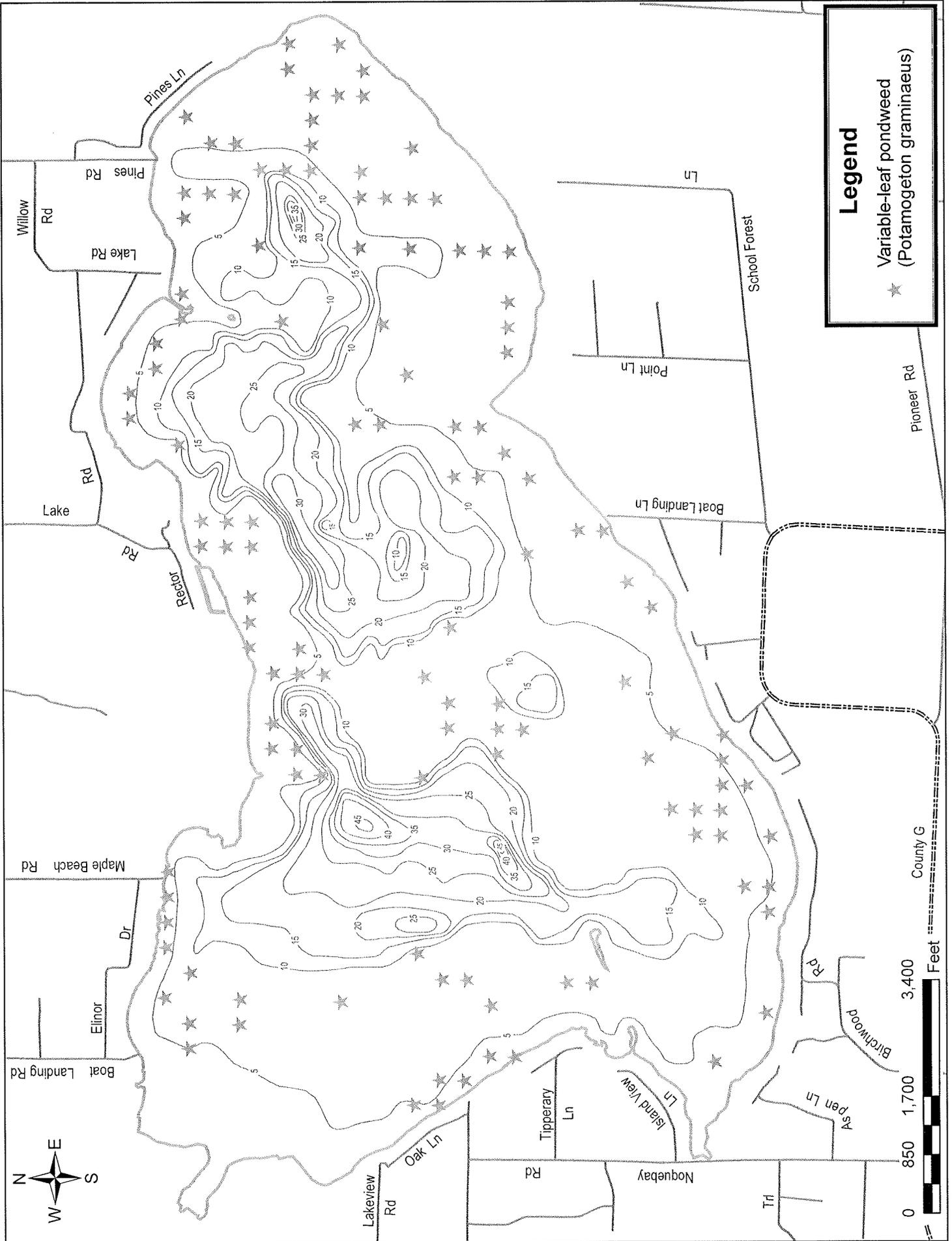




Legend

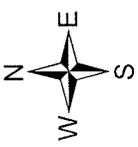
Flat-stem pondweed
(*Potamogeton zosteriformis*)

*

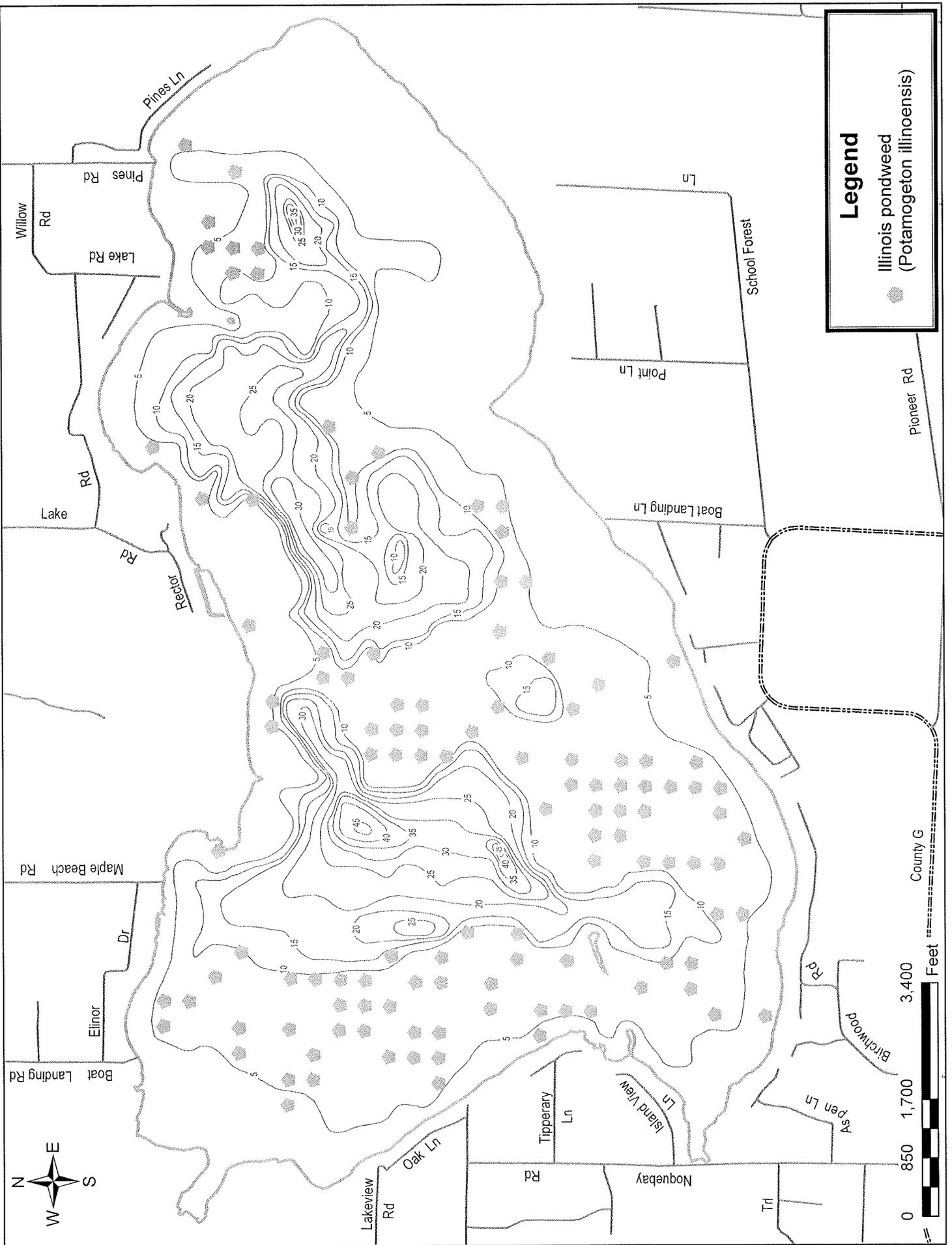


Legend

- ★ Variable-leaf pondweed (Potamogeton gramineus)

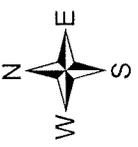


County G



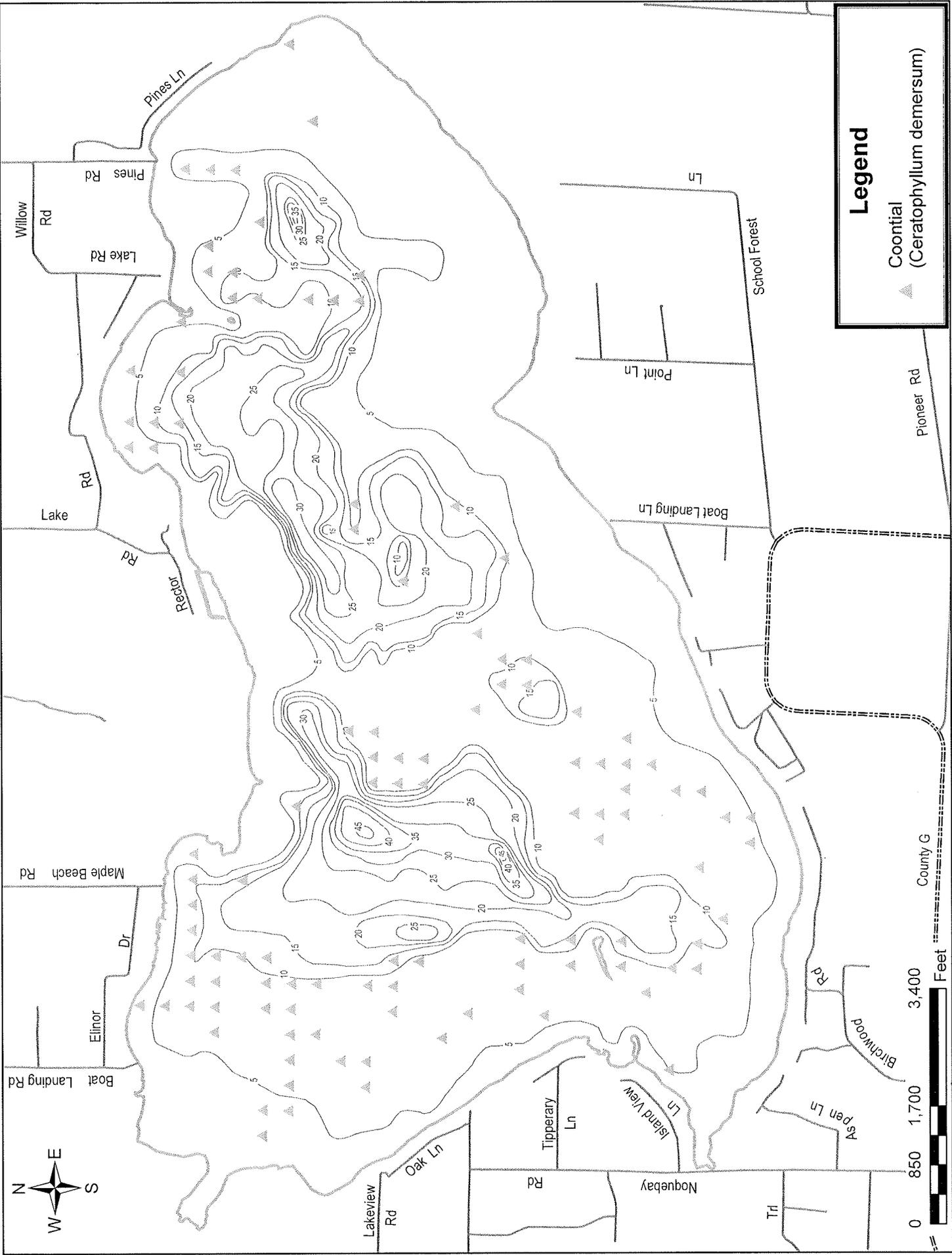
Legend

● Illinois pondweed
(*Potamogeton illinoensis*)



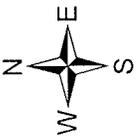
Map labels include:

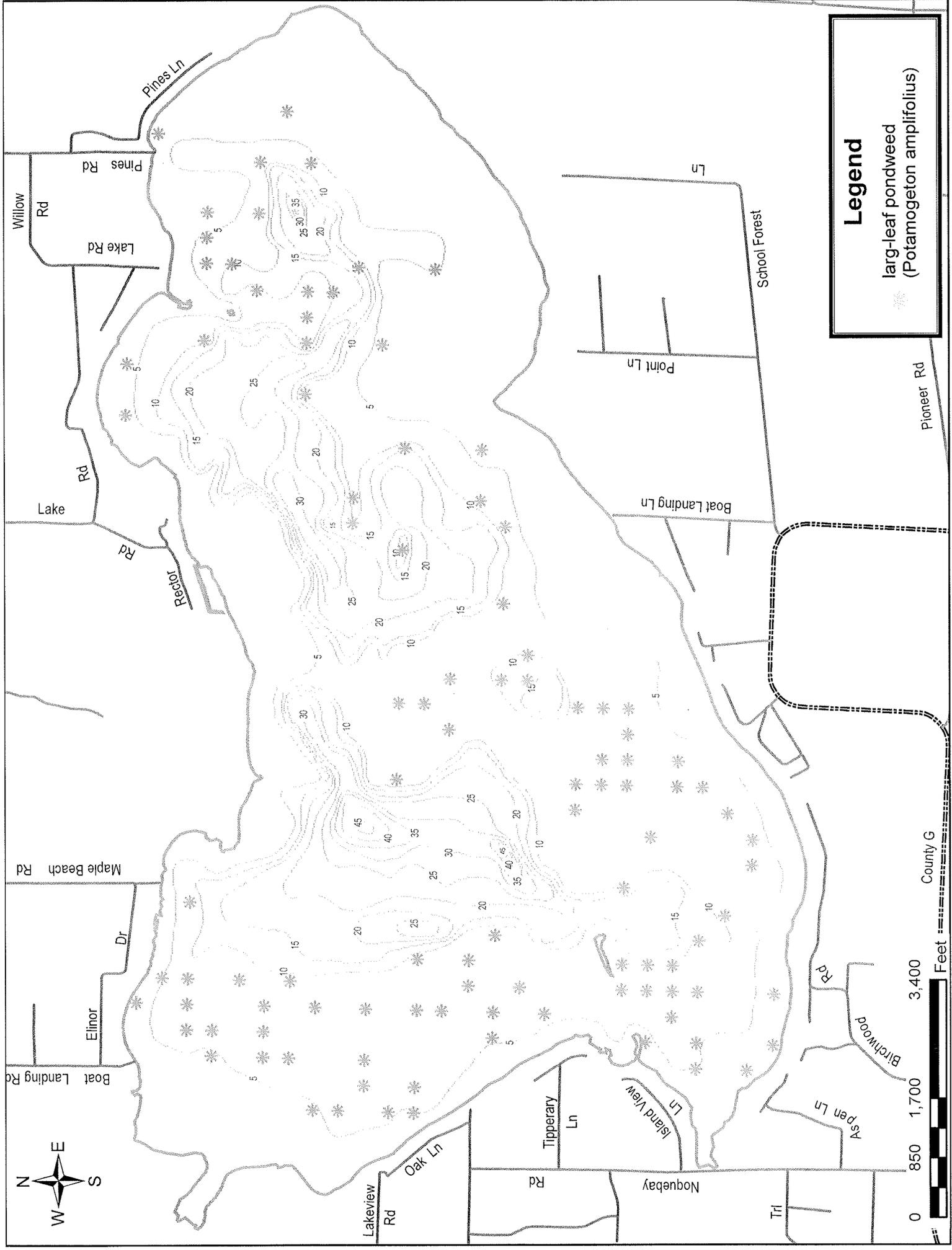
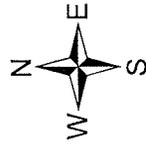
- Willow Rd
- Pines Rd
- Lake Rd
- Pines Ln
- Lake Rd
- Reactor Rd
- Boat Landing Ln
- Point Ln
- School Forest
- Pioneer Rd
- Maple Beach Rd
- Elinor Dr
- Boat Landing Rd
- Lakeview Rd
- Oak Ln
- Tipperary Ln
- Island View Ln
- Noquebay Rd
- Aspen Ln
- Birchwood Rd
- County G



Legend

▲ Coontial
(*Ceratophyllum demersum*)

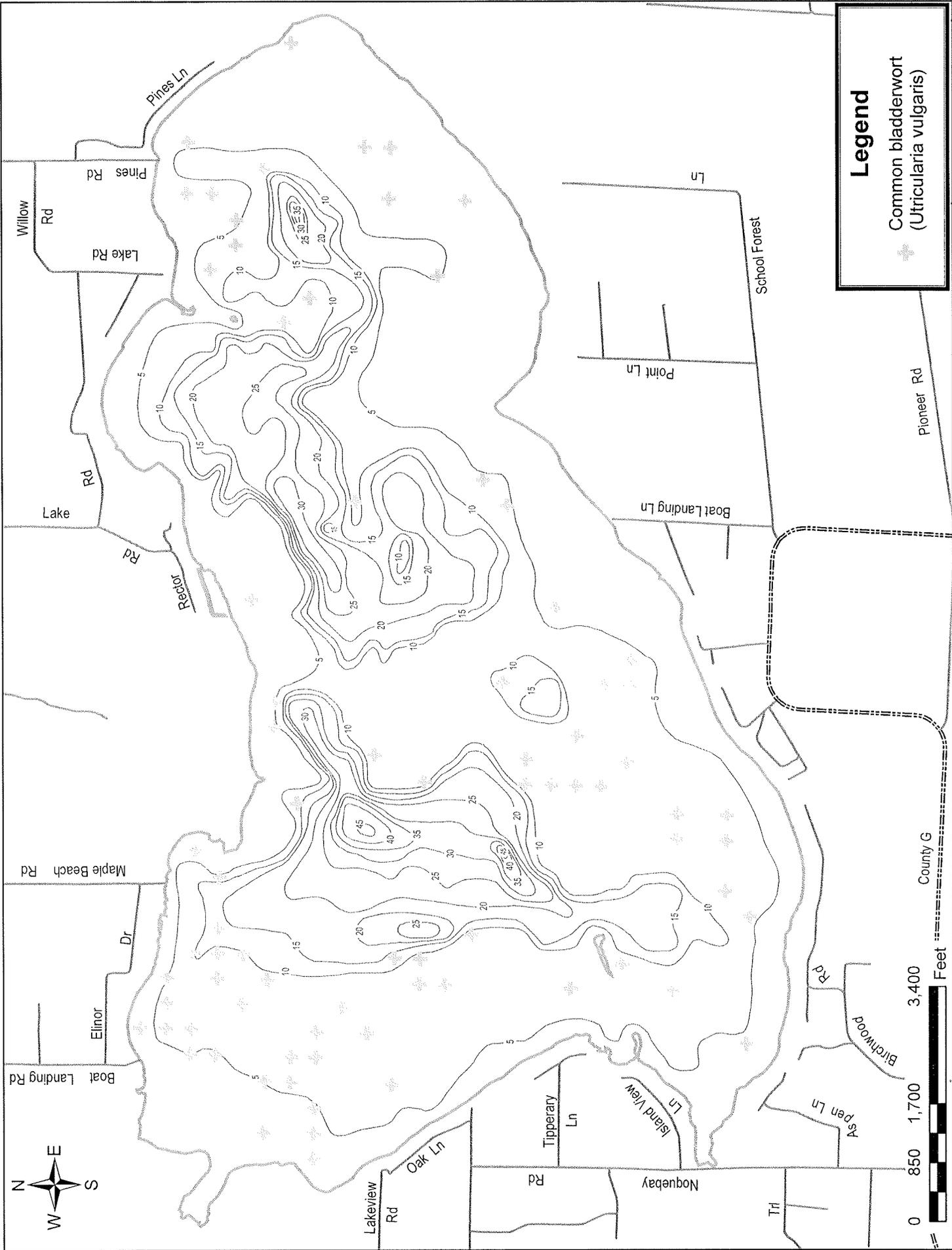




Legend

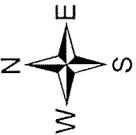
larg-leaf pondweed
(*Potamogeton amplifolius*)



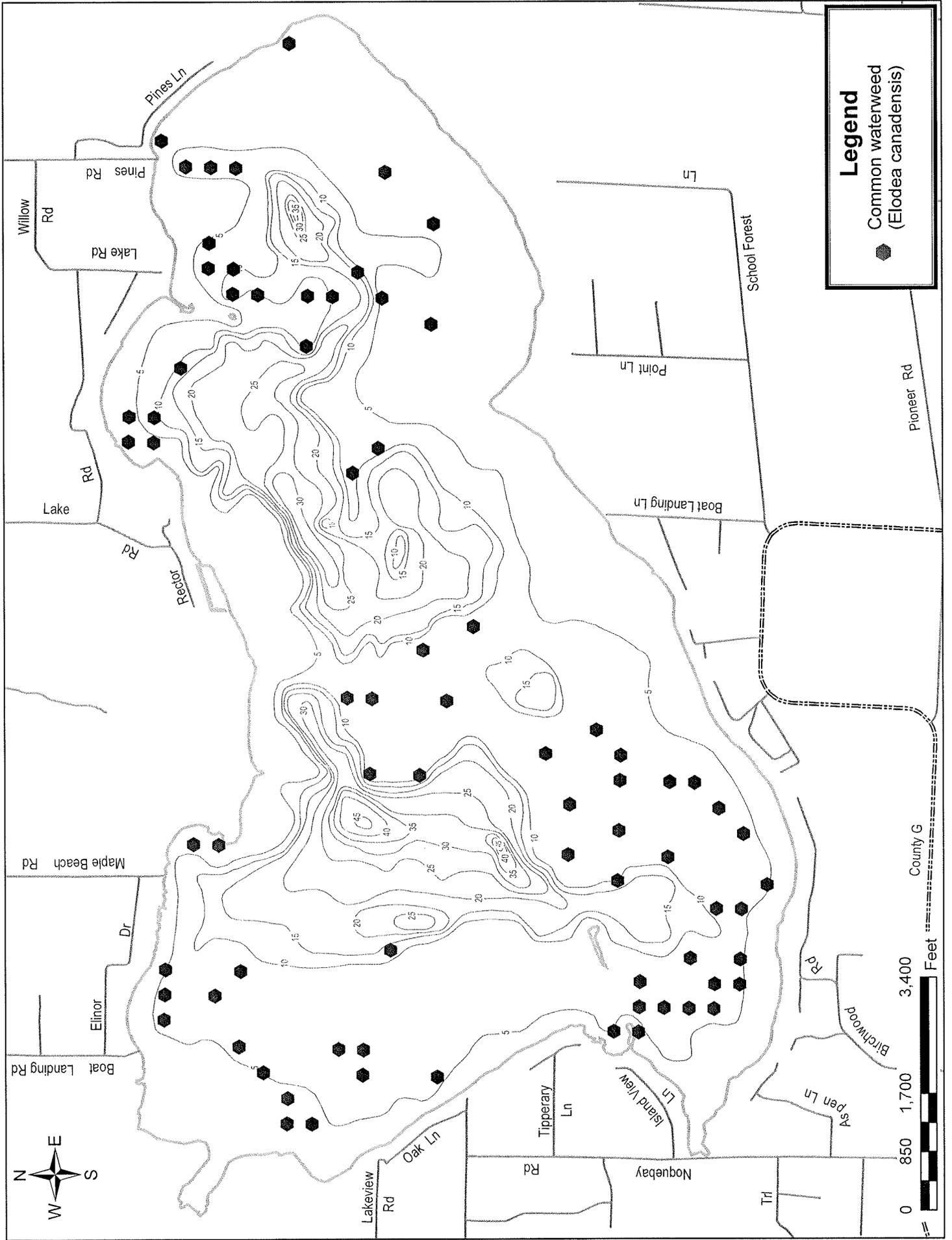


Legend

Common bladderwort
(*Utricularia vulgaris*)



County G

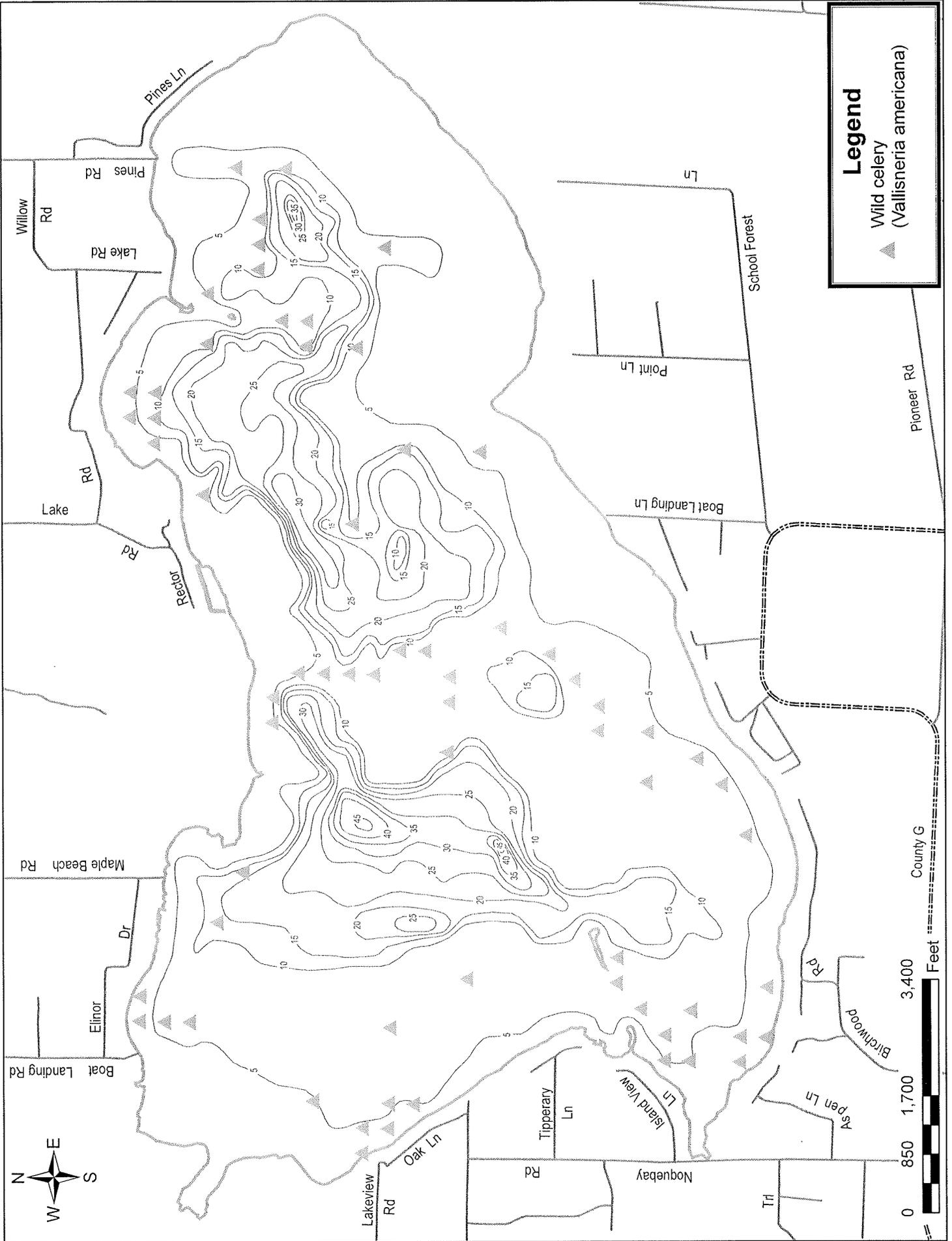


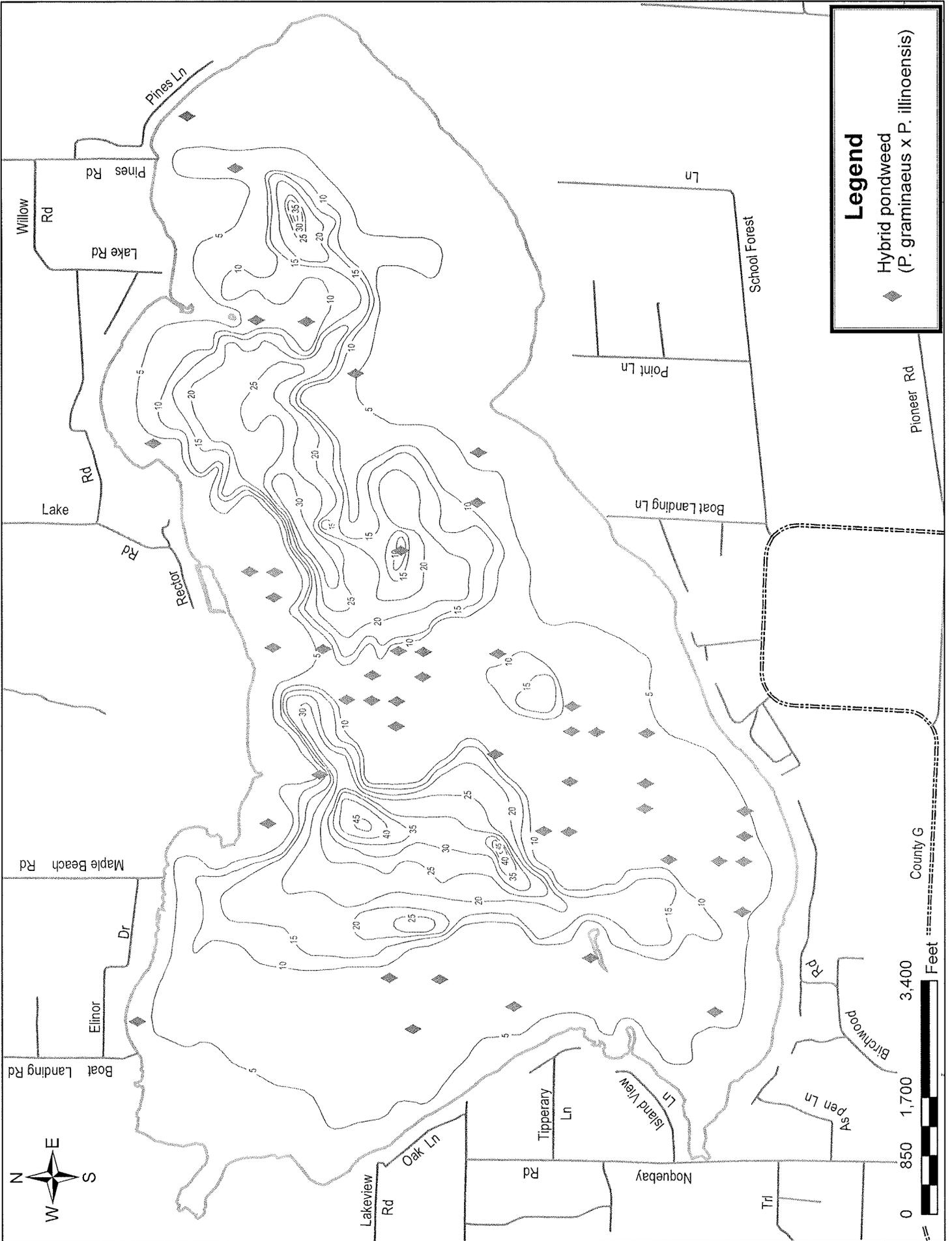
Legend

- Common waterweed (*Elodea canadensis*)

County G





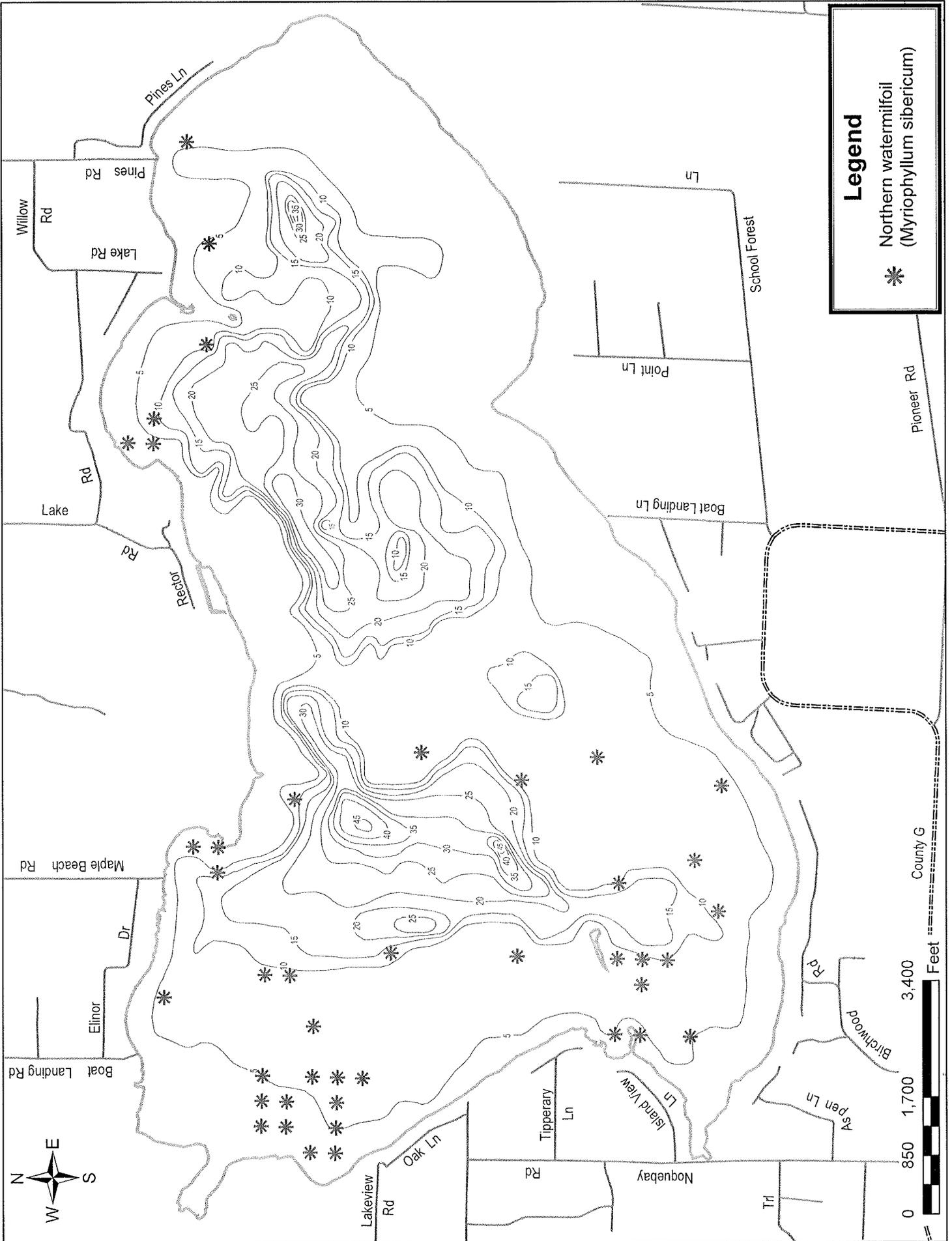


Legend

◆ Hybrid pondweed
(*P. gramineus* x *P. illinoensis*)

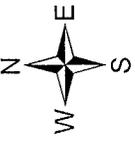
0 850 1,700 3,400 Feet

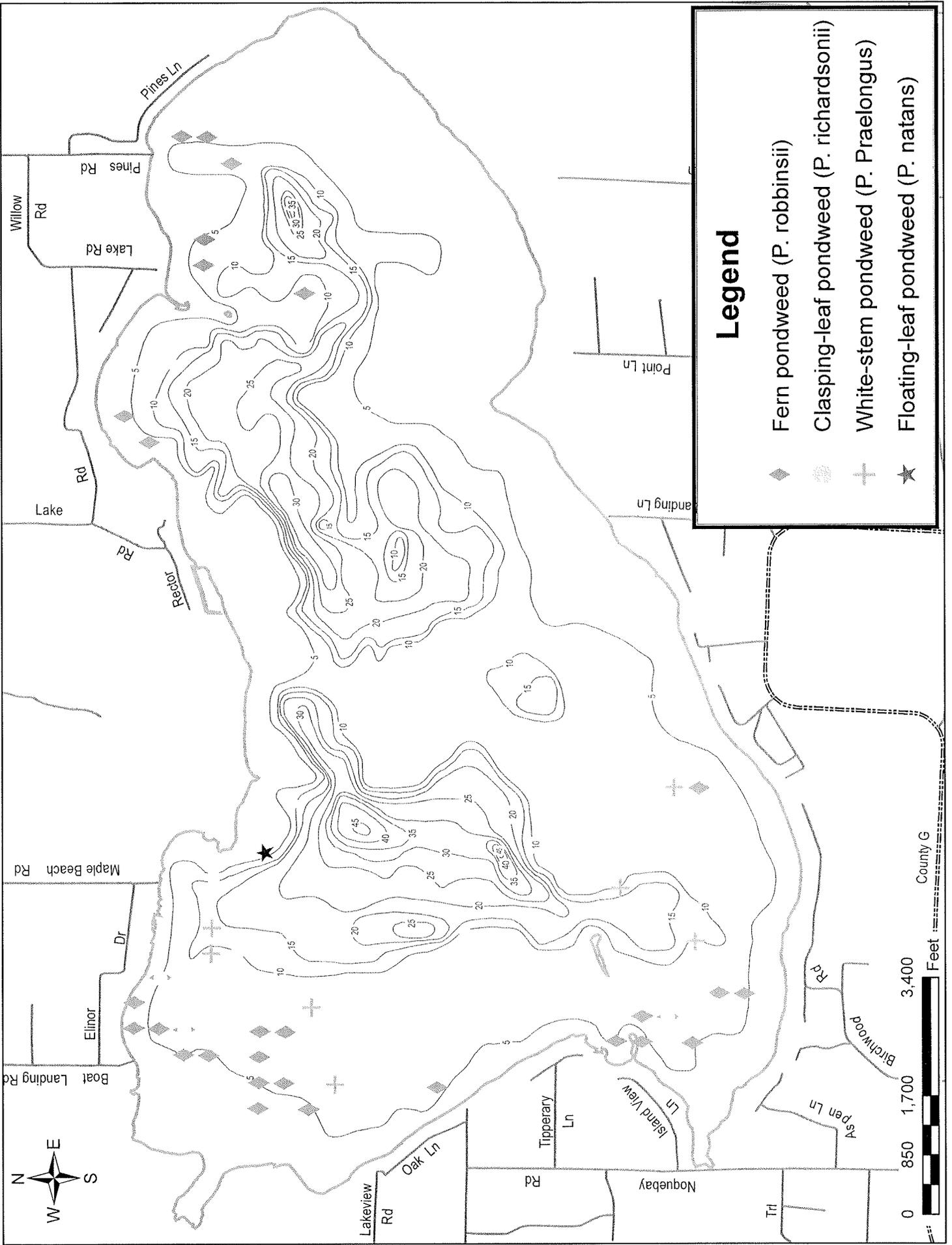
County G



Legend

* Northern watermilfoil
(*Myriophyllum sibiricum*)



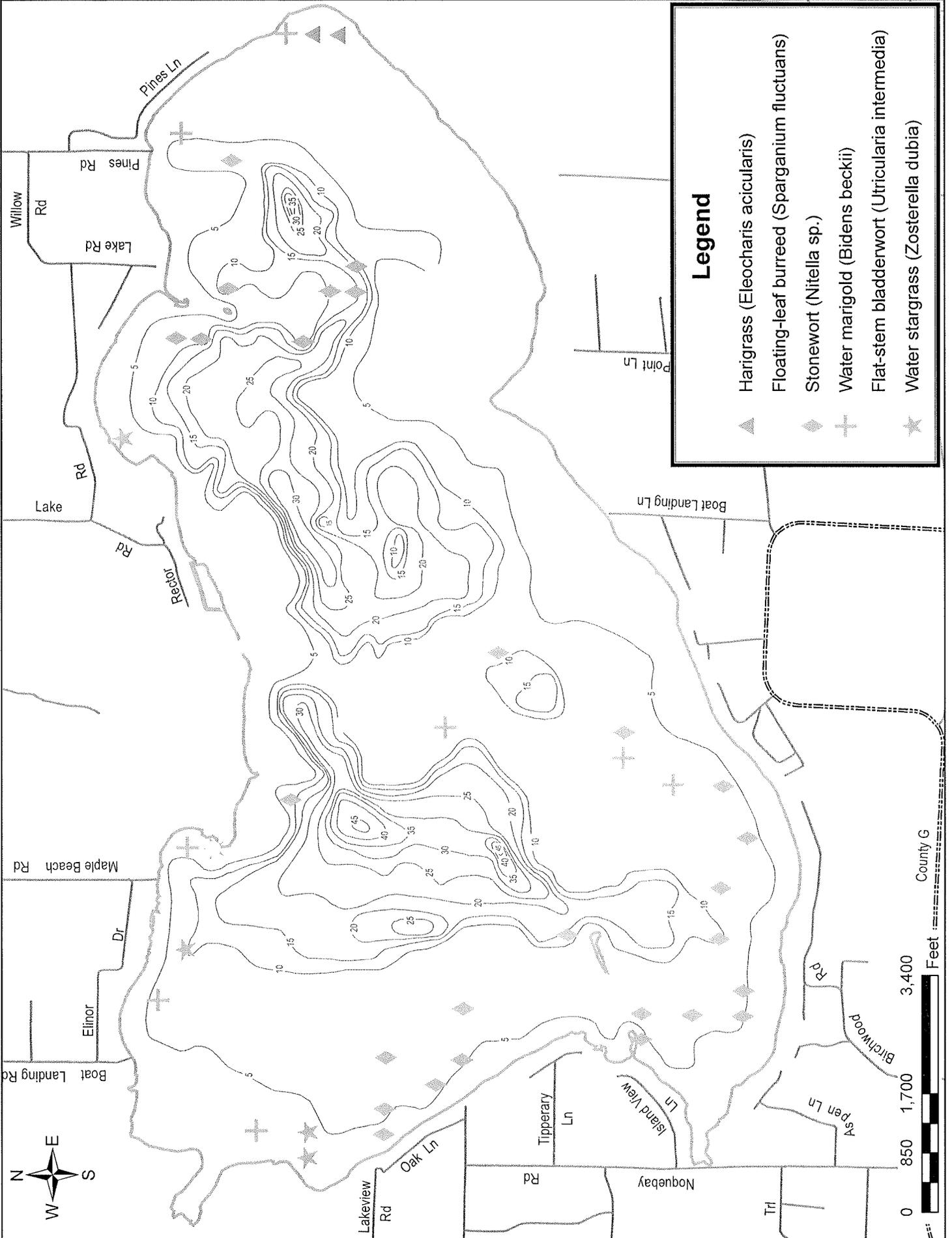


Legend

- ◆ Fern pondweed (*P. robbinsii*)
- Clasping-leaf pondweed (*P. richardsonii*)
- ✚ White-stem pondweed (*P. praelongus*)
- ★ Floating-leaf pondweed (*P. natans*)



County G



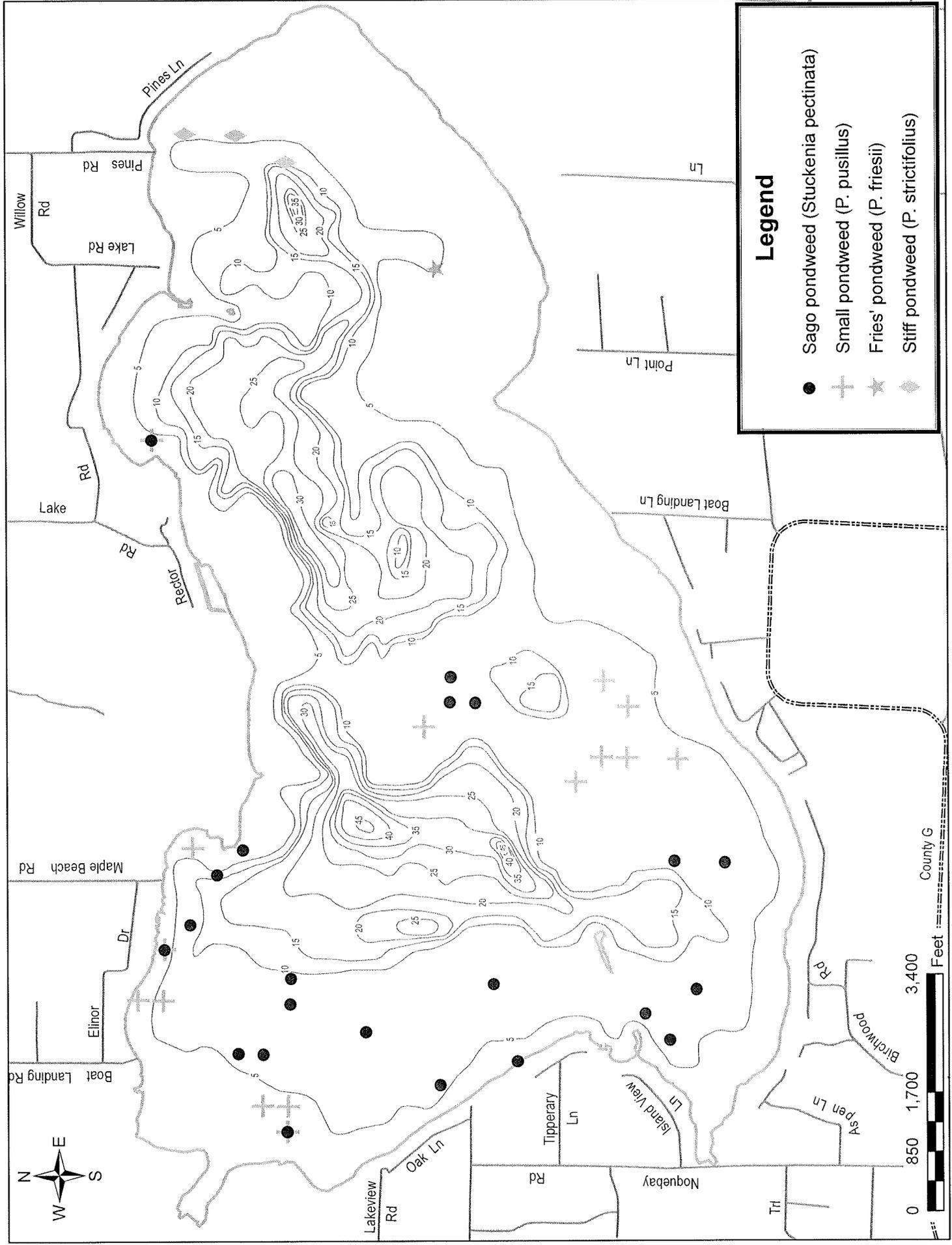
Legend

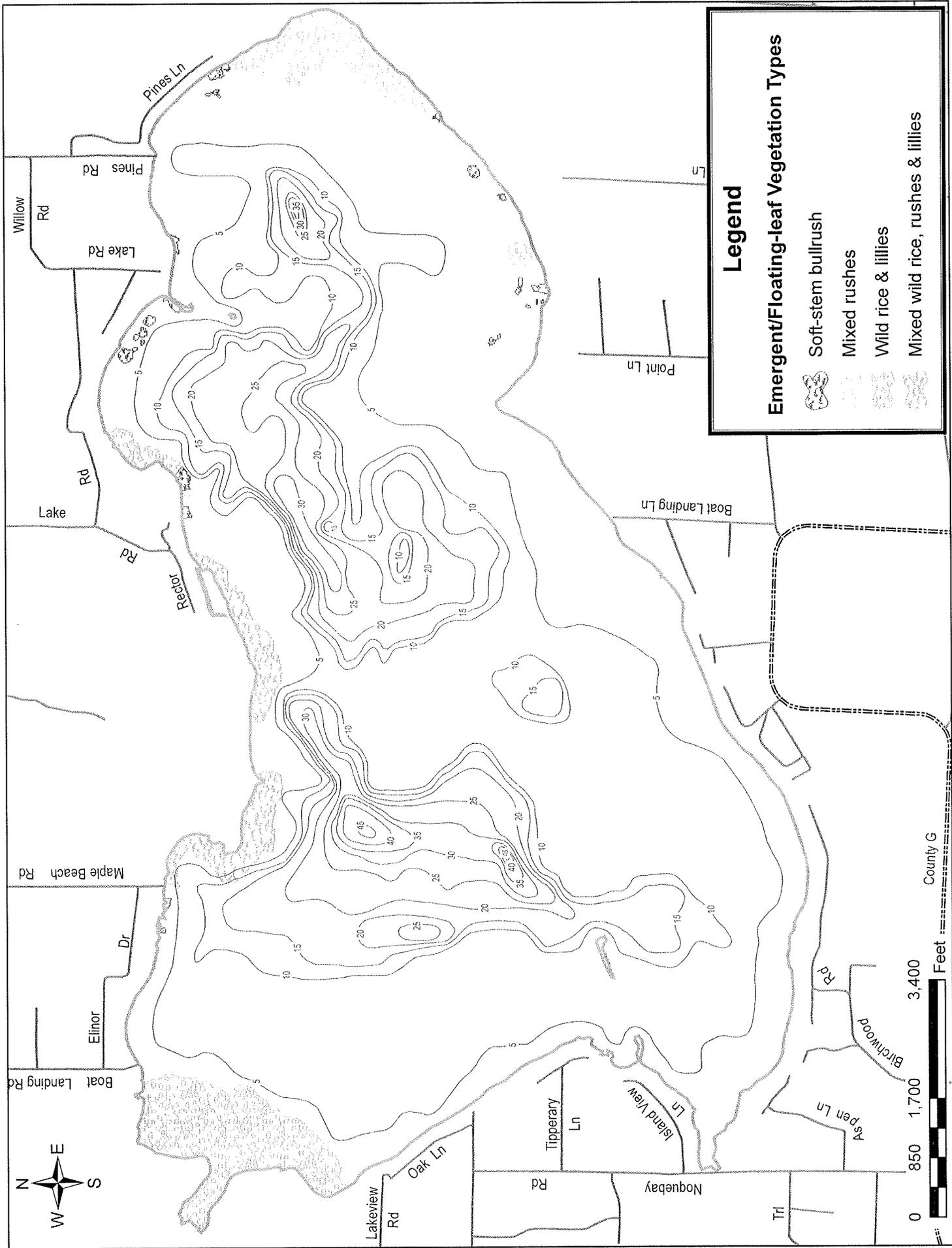
- ▲
Hairgrass (*Eleocharis acicularis*)
- ◆
Floating-leaf burreed (*Sparganium fluctuans*)
- +
Stonewort (*Nitella* sp.)
- ★
Water marigold (*Bidens beckii*)
- ★
Flat-stem bladderwort (*Utricularia intermedia*)
- ★
Water stargrass (*Zosterella dubia*)

County G

Feet

0 850 1,700 3,400

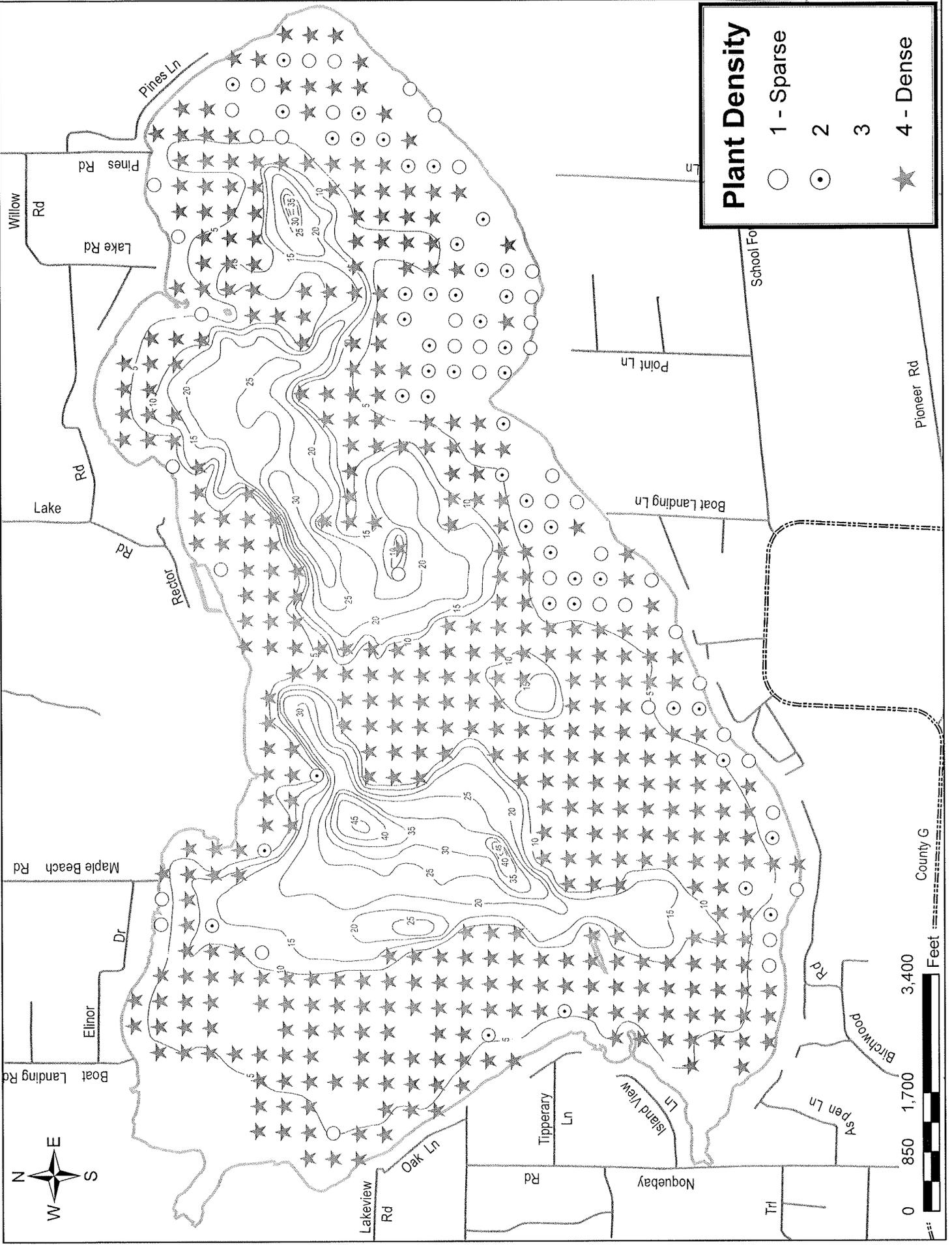




Legend

Emergent/Floating-leaf Vegetation Types

-  Soft-stem bullrush
-  Mixed rushes
-  Wild rice & lillies
-  Mixed wild rice, rushes & lillies



Plant Density

- 1 - Sparse
- ◉ 2
- ◉ 3
- ★ 4 - Dense

